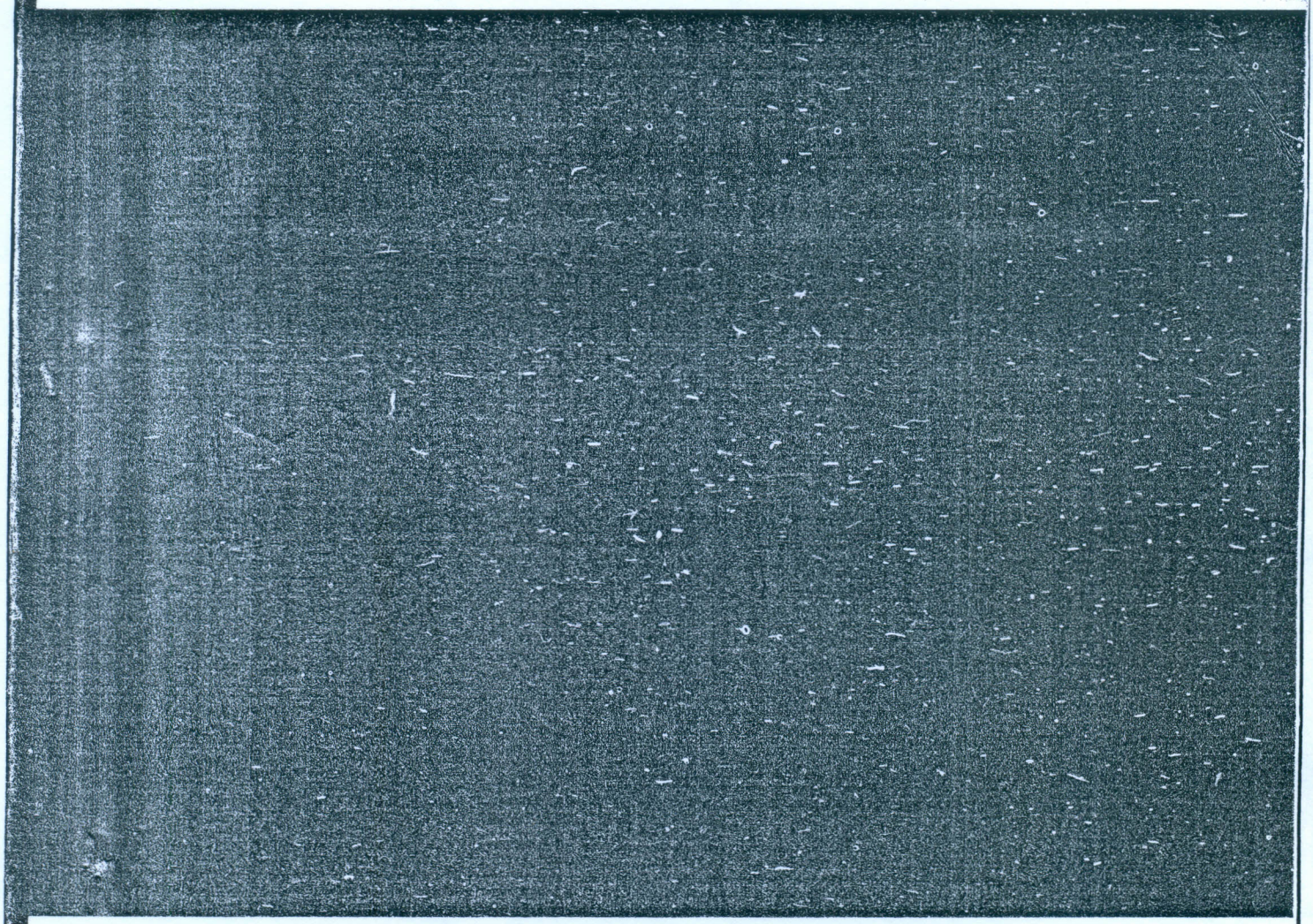
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The ADSU Journal of Social and Development Studies is an interdisciplinary policy and development oriented Journal that disseminates high quality empirical and theoretical studies by scholars and professionals. Although the focus of the Journal is on the Social and Management Sciences, it welcomes development and policy-oriented articles from the natural sciences, education and the humanities.

The coverage of the current issue includes, among others, articles on development administration, political and economic development, banking, stock market, manufacturing, E-commerce, debt management and geographical information systems.

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An Appraisal of Usefulness of Break-Even Analysis to Business Managers in Decision Making

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Abstract
The focus of study is an appraisal of usefulness of break-even analysis to business managers in decision making. The study relied on both qualitative and quantitative analysis of data. A total of 120 copies of the questionnaire were administered out of which 85 copies were however returned and found suitable for analysis, The data obtained through questionnaire were analyzed using descriptive statistics and inferential statistics such as frequency distribution and a strong and robust non-parametric statistics called G-Test, respectively. The results of the analysis showed that Break-Even Analysis is useful to Business Managers in Decision Making. The recommendations based on the findings are- breakeven analysis can be used not only for manufacturing companies, but also for companies that provide services; in using breakeven analysis in decision making all the information which is relevant must be available; and to effectively use break-even analysis in decision making all the data must be expressed in monetary value and relating to costs and revenues as measured by the management accountant.

Key Words: Break-Even Analysis, Profitability, Usefulness, Managers, Decision Making

Introduction

The need for a decision arises in business because a manager is faced with a problem and alternative courses of action are available. In deciding which option to choose he will need all the information which is relevant to his decision; and he must have some criterion in the basis of which he can choose the best alternative. Some of the factors affecting the decision may not be expressed in monetary value. Hence, the manager will have to make" qualitative" judgments' for instance, in deciding which of two personnel should be promoted to a management position. A "quantitative" decision, on the other hand, is possible where the various factors, and relationships between, are measurable. The use of break-even analysis in decision making concentrate on quantitative decisions based on data expressed in monetary value and relating to costs and revenues as measured by the management accountant.

In your business planning according to Wyoming SBDC (2002), have you ever been asked how much do I have to sell to reach my profit goal? How will a change in my fixed costs affect my net

income? How much do my sales need to increase in order to cover a planned increase in advertising costs? What price should I charge to cover my costs and allow for a planned amount of profit? These are some of the questions according to Wyoming SBDC(2002), that you can easily answer by using simple break-even analysis. Break-even analysis is a very useful tool because it can help you understand the sources of profit in your business. Break-even analysis is the use of a simple mathematical formula to determine the sales level at which the business neither incurs a loss nor makes a profit. The break-even point, in mathematical terms, is simply the point where: Total Expenses Net Sales Revenue.

The break-even point according to Enotes.com Inc (2009), has its origins in the economic concept of the "point of indifference." From an economic perspective, this point indicates the quantity of some goods at which the decision maker would be indifferent, i.e., would be satisfied, without reason to celebrate or to opine. At this quantity, the costs and benefits are precisely balanced. Similarly, the managerial concept of break-even analysis seeks to find the quantity of output that just covers all costs so that no loss is generated. Managers can determine the minimum quantity of sales at which the company would avoid a loss in the production of a given good. If a product cannot cover its own costs, it inherently reduces the profitability of the firm.

While many at times it is assumed that the producer is a manufacturer (i.e., labour and materials), break-even analysis may be even more important for service industries. The reason for this lies in the basic difference in goods and services: services cannot be placed in inventory for later sale. What is a variable cost in manufacturing may necessarily be a fixed cost in services. Whatever method is used, the goal of these service industries according to Enotes.com Inc (2009), is the same as that in manufacturing: reduce fixed costs to lower the break-even point.

Break-even analysis is a simple tool that defines the minimum quantity of sales that will cover both variable and fixed costs. Such analysis gives managers a quantity to compare to the forecast of demand. If the break-even point lies above anticipated demand, implying a loss on the product, the manager can use this information to make a variety of decisions it must be noted that organizations exist among other reasons to make as much profit as possible for any company to survive, it needs to produce its goods and services at a level where it at least makes no losses. That point where the total cost incurred in the production of goods equates revenues realized from their sales is called the break-even point. The break-even point is where total revenue equals total cost. Whenever the break-even point is exceeded then profits greater than zero; when it cannot be achieved profit is less than zero. The break-even analysis studies the relationship between the volume and cost of production on one hand, and revenue and profits or loss obtained from the sales of the production on the other. The break-even analysis also provides answers to the following questions- what level of output is necessary to avoid making losses; what amount of profit or loss can be expected at various levels of output? And what level of output is necessary to achieve a desired level of profit?

At this point, it is difficult to overstate the importance of break-even analysis to sound business management and decision making. Benoliel (2002), suggested that, any company that ignores the break-even point runs the risk of an early death and at the very least will encounter a lot of unnecessary headaches later on. It is in line with this that the study focuses on the usefulness of break-even analysis to managers in decision making. In specific terms, the objectives of the study are:

i. To examine who are managers.
ii. To look at break-even analysis equation and calculation.
iii. To find out if Break-Even Analysis is useful to Business Managers in Decision Making.

Literature Review

Manager

A manager according to Yalokwu(2006), is an individual who holds a position of authority in an organization(be it a government office, a business firm or non-governmental organization) and makes decisions about allocating human and material resources.

Managers according to Invancevich et al (1997), are individuals who guide, direct, or oversee the work and performance of other individuals.

To www.investorwords(2009), manager, could be seen to be the person(s) responsible for the overall strategy and the specific buying and selling decisions for a mutual fund(called a fund manager) or other financial institution(called a money manager).

In view of en.wikipedia.org/wiki/Manager(2009), a manager is anyone who uses management skills or holds the organizational title of "Manager". Or a manager of a department in an organization or a manager of a division (business).

Organizations fail for many reasons- insufficient funds, improper marketing, inappropriate product design, and so on. However, they most often fail because of poor management. For this reason an organization, no matter how potentially viable it may be, is worth no more than the quality of its managers. It is they who determine whether our social and economic institutions serve us well or whether they squander our talents and resources.

Decision Making

Daft (1988), see decision making as the process of identifying problems and opportunities, generating alternatives, selecting an alternative and implementing the solution.

To Kreitner(1992), decision making is the process of identifying and choosing courses of action. Invancevich et al (1997), see decision making process as a series of related steps or stages that lead up to an action, an outcome, and assessment.

Decision making according to Nickels, Mchugh and Mchugh(2002), is choosing among two or more alternatives. It sounds easier here than is in practice. In fact, decision making is the heart of all the management functions. The rational decision making model is a series of steps managers should follow to make logical, intelligent, and well-founded decisions. These steps according to Nickels et al(2002), can be thought of as the seven Ds of decision making:

i. Define the situation
ii. Describe and collect needed information
iii. Develop alternative
iv. Develop agreement among those involved
v. Decide which alternative is best
vi. Do what is indicated(begin implementation)
vii. Determine whether the decision was a good one and follow up

Decision is a means to an end and not an end in itself. Decisions have to be made and re-made in the light if ends to be achieved. Decisions are dynamic in nature, they are not permanent so long as they have to take cognizance of the changed circumstances. Decisions have to be responsive to varying situations. Thus, in view of Eghe (2003), decision making in fact, means, choosing one course of action rather than another, finding a suitable solution to a new problem posed by a changing world.

Decision making in view of Yalokwu (2006), is an important aspect of the managerial role in organizations. Hundreds of decisions are made daily at all levels in busy and large organizations. Regardless of goals, no organization can survive for a long time, according to Yalokwu (2006), without cultivating and maintaining effective managerial decision-making skills. So, irrespective of the objectives of an organization, decision making is inescapable for any organization to function.

Although, the scope and impact of a decision varies greatly from one level in the organizational to another. Simon (1960) in Andersson, Fries and Johansson(2008), argues that some generalization is possible. That is, decision making includes four distinct phases. The first phase is finding situations for making decision intelligence. The second phase is referred to as design, where different courses of action are investigated. In the third phase, one of the available courses of action is chosen. This is called choice activity. The fourth phase is a review, in which previous choices are evaluated.

Haris (2009), sees decision making as the study of identifying and choosing alternatives based on the values and preferences of the decision maker. That is making a decision implies that there are alternative choices to be considered, and in such a case we want not only to identify as many of these alternatives as possible but to choose the one that (1) has the highest probability of success or effectiveness and (2) best fits with our goals, desires, lifestyle, values, so on. Harris (2009), also sees decision making as the process of sufficiently reducing uncertainty and doubt alternatives to allow a reasonable choice to be made from among them. This definition stresses the information gathering function of decision making. It should be noted here that uncertainty is reduced rather than eliminated. Very few decisions are made with absolute certainty because complete knowledge about all the alternatives is seldom possible. Thus, every decision involves a certain amount of risk. If there is no uncertainty, you do not have a decision, you have an algorithm- a set of steps or a recipe that is followed to bring about a fixed result.

All the meanings of decision making as noted above can be summarized and captured as the process of choosing a course between alternatives for the purpose of achieving a desired result.

Break-Even Analysis

In any business the manager of a business has to make irrespective of what they produce they have to ensure that the products they produce maximize owners equity. That is the products and services they offer can make a profit and to identify loss making products and introduce new products if they have a profitable market. In addition, they must have a cost control system, which can minimize overheads and direct cost of producing goods and services. Break-Even analysis according to Bukisa.com(2008), is one of the simplest method for a business to make the above mentioned decisions. In effect break even analysis enable business managers to make effective decisions based on sound rational basis and based on cost information and other limiting factors. As well, it gives the manager how a manger can improve profitability of the business as a whole in a dynamic and uncertain market place my monitoring cost and improving the efficiency of the organization on a continuous basis.

Break-Even Formula

Break-even point can be determined more quickly and accurately by using a formula. The following are the symbols generally used:-

BEP = Break-Even Point
TR = Total Revenues
TC = Total Costs
P (SP) = Selling Price
FC = Fixed Cost
TFC = Total Fixed Cost
VC = Variable Cost
Q = Quantity of Output or number of units produced
TR = PQ
TC = F+ V × Q
TC =VC+FC
Contribution per unit = Selling price per unit — Variable cost per unit
TR -- TC Profit

Because there is no profit (N0) at the **break-even point**, TR- TC 0, and then P × Q - (F+ V × Q) = 0. Finally, Q = F(P-V) or BEP = Fixed Cost/ Contribution per unit

Calculation of Break - Even output/Units

The following table shows the sales, variable costs, fixed costs and profits from various levels of output of a business organization:

The product is sold for N25.00 per unit. The variable cost per unit is N10.00. Fixed costs are N100,000.00 (the same at each level of output)

Output	Sales	Variable Costs	Fixed Costs	Total Costs	Profit
'000	N'000	N'000	N'000	N'000	N'000
0	0	0	100	100	-100
1	25	10	100	110	-85
2	50	20	100	120	-70
3	75	30	100	130	-55
4	100	40	100	140	-40
5	125	50	100	150	-25
6	150	60	100	160	-10
7	175	70	100	170	5
8	200	80	100	180	20
9	225	90	100	190	35
10	250	100	100	200	50

Source: Research Databank (2009) Adapted from www.tutor2u.net. Accessed 19/12/2009

Using the table, you can see the break-even output is somewhere between 6,000 and 7,000 units. At 6,000 units, the business makes a loss of N 10,000.00. At 7,000 units, the business makes a profit of N5,000.

Using a formula to calculate break-even output

Let us use the same information as above to show how a formula can be used to quickly calculate the break-even output.

Contribution per unit = selling price per unit less variable cost per unit.

In this example, contribution per unit = N25 less N10 = N15 per unit

Now the formula:

Break-even output(units) = Fixed costs(N) /Contribution per unit(N)

Recall Contribution per unit = Selling price per unit - Variable cost per unit

Here, contribution isN25 - N10 =N15 So, break-even output = N1 00,000/N15 = 6,666

Note: break-even output is always expressed in terms of units.

So **break-even Output = 6,666**

The use of table or chart is always a long process than this formula in a situation where all the relevant data are available. That is where there are proper books are kept and maintained.

Break-Even Analysis and Decision Making

Calculating the break-even point (through break-even analysis) can provide a simple, yet powerful quantitative tool for managers. Managers can use this information in making a wide range of business, decisions, including setting prices, preparing competitive bids, and applying for loans. Managers can determine the minimum quantity of sales at which the company would avoid a loss in the production of a given good. If a product cannot cover its own costs, it inherently reduces the profitability of the firm.

Breakeven analysis according to Osgood (2009) is a powerful management tool, and one that is critical in planning, decision-making, and expense control. Breakeven analysis in view of Osgood can be invaluable in determining whether to buy or lease, expand into a new area, build a new plant, and many other such considerations.

Furthermore, breakeven analysis can also show the impact on business of changing a price structure. As the price goes down (and so the gross margin goes down), breakeven shoots up-usually very rapidly. Breakeven will provide a sales objectives that can be expressed in either Naira or units of production or sales, or whether else is relevant. If the breakeven point is known, it can be a definite target to be reached and exceeded by carefully reasoned.

It is a useful tool because it helps managers to estimate the outcome of their plans. The marketing- controlling department of an enterprise may use breakeven analysis to estimate the results of an increase in production volume or when evaluating the option of investing in new, high technology machinery.

Breakeven analysis according to Tsorakidis et al(2009), is useful as a first step in developing financial applications which can be used in invoicing and budgeting. The main purpose of this analysis, according to Tsorakidis et al (2009), is to have some idea of how much to sell, before a profit will be made. Breakeven analysis is extremely important before starting a new business (or launching a new product) because it gives answers to crucial questions such as "how sensitive is the profit of the business to decreases in sales or increases in costs". This analysis can be also extended to early stage business in order to determine how accurate the first productions were and monitor whether the firm is on the right path(the one that leads to profits) or not. Even, mature business must take into consideration their current breakeven point and find ways to lower that benchmark in order to increase profits.

Breakeven analysis can be used not only for companies that products, but also for companies that services.

In effect, breakeven analysis enable business managers to make effective decisions based on sound rational basis and based on sound rational basis and based on cost information and other limiting factors. As well, it gives the manager how he can improve profitability of the business as a whole in a dynamic and uncertain market place by monitoring cost and improving the efficiency of the organization on a continuous basis.

Restrictions of Break-Even Analysis

Despite its useful applications, breakeven analysis according to Tsorakidis et al(2009), is subject to some restrictions. This is like any other concept has its limitations. In every single estimation of the breakeven level, we use a certain value to the variable "selling price". Therefore, if we want to find out the level that produces profits under different selling prices, many calculations and diagrams are required.

A second drawback has to do with the variable "total costs ", since in practice these costs are difficult to calculate due to the fact there are many things that can go wrong, and mistakes, that can occur in production.

Another effect that is not algebraically measured, is that, changes in costs may alter products' quality.

Tsorakidis et al (2009), also noted that the breakeven point is not easily estimated in the "real world", because there is no in mathematical calculation that allows for the "competitive environment ". This refers to the fact that the competition may cause prices to drop or increase according to demand.

In spite of the limitations/restrictions, the breakeven analysis is very useful in planning an d controlling. The model emphasizes the effects of additional expenses or changes in volume bringing to the mangers attention the marginal results of his decisions.

The breakeven analysis is very simple analytical tool, yet it has power in improving decisions since it applies basic economic theory using data usually available from accounts.

The information it provides may not be precisely accurate, but it usually accurate enough to justify its use as a decision making tool and as a control device.

Methodology

The study was undertaken in Ilorin metropolis from a selected business organizations. The data was obtained from two major sources-primary and secondary. Primary data was collected using a self-developed questionnaire designed to capture views of managers on the usefulness of breakeven analysis in decision- making. Secondary data was sourced from published materials and from the internet. 120 copies of questionnaires were administered on managers with experience ranging between 5-I 5years using a simple random sampling technique. 85 copies of the questionnaire were however returned and found suitable for analysis.

The data is presented in the form of tables showing frequencies and percentages. Following each table is the descriptive analysis of the findings. Statistical technique used in analyzing the data is a strong and robust non-parametric statistics called G-Test.

The general formula for G is

$$G = 2\sum_{ij} Oij.\ln(O_{ij} / Eij$$

Or simply G= $2\sum[0 \times \ln(0/E)]$

As with most test statistics, the larger the difference between observed and expected, the larger the test statistic becomes.

Where:-

n= the number of observation

Or= Observed frequency

E = Expected frequency

ln=Natural logarithm (log to the base e)

$$E = \frac{Columns\ Total \times Row\ Total}{Grand\ Total}$$

Degree of freedom

d.f = (r-1)(c-1)

where:-

r = number of rows

c = number of columns

5% level of significance was used so as to be at least 95% confident that we are making the right decision.

Decision Rule

In analyzing the data, the following decision rule served as a guide:

- Reject the null hypothesis (Ho) and accept the alternative hypothesis (Hi) if the observed value of G is greater than the critical value,
- Accept the null hypothesis (Ho) and reject the alternative hypothesis (Hi) if the observed value is less than the critical value.

Research Hypothesis

The statement of hypothesis formulated for the study is as follows:

Ho: Break-Even Analysis is not useful to Business Managers in Decision Making.

Hi : Break-Even Analysis is useful to Business Managers in Decision Making.

Results and Discussion

This section analyses the findings from a set of eighty copies of questionnaires that were returned and found suitable for analysis.

Table 1: Distribution of Respondents by Sex

Sex	No. of Respondents	Percentage (%)
Male	52	61
Female	33	39
TOTAL	85	100

Source: Author's Data Bank (2009)

Table 1 above shows that, out of the 85 respondents, 52 are males, representing 61% while 33 respondents are females representing 39%.

Table 2: Distribution of Respondents (Managers) by years of Experience

Years of Experience	No. of Respondents	Percentage (%)
Managers with 15 years	22	25.9
Managers with 10 years	21	24.7
Managers with 7 years	18	21.2
Managers with 5 years	24	28.2
TOTAL	85	100

Source: Author's Data Bank (2009)

Table 2 shows the distribution of respondents (Managers) by years of Experience. An interesting observation here is that, we have significant number of respondents from all the four categories identified. Meaning the views of Mangers with different years of experience are captured.

Table 3: Break-Even Analysis is useful to Business Managers in Decision Making

Years of Experience	No. of Respondents	Percentage(%)	Total
Years of Experience	YES	NO	22
Managers with 15 years	22	0	21
Managers with10 years	16	5	18
Managers with 7 years	16	2	24
Managers with 5 years	24	0	85
TOTAL	78(91.8%)	7(8.2%)	

Source: Author's Data Bank (2009)

Table 3 summarized the responses to the question as to whether break-even analysis is useful to Business Managers in Decision Making. 78(91.8%) of the respondents agreed that, break-even analysis is useful to Business Managers in Decision Making. 7(8.2%) of the respondents said no. The number of "Nos" recorded could be seen to come from Managers whose organizations do not proper accounting records. Personal interaction with the Managers revealed that some of them do not possess basic accounting knowledge. This makes it difficult for some of them to effectively maximize the full advantage of break even analysis. They often relied fully on what is reported to them by the so called accountants, who are better described as account clerks.

Testing of Hypothesis

Ho: Break-Even Analysis is not useful to Business Managers in Decision Making.

Hi: Break-Even Analysis is useful to Business Managers in Decision Making.

Table 4: Observed Frequency (Oi)

Years of Experience	YES	NO	Total
Managers with 15 years	22	0	22
Managers with 10 years	16	5	21
Managers with 7 years	16	2	18
Managers with 5 years	24	0	24
Total	78	7	85

Source: Author's Data Bank (2009)

Table 5: EXPECTED FREQUENCY (Ei)

Years of Experience	YES	NO	Total
Managers with 15 years	20.19	1.81	22
Managers with 10 years	19.27	1 .73	21
Managers with 7 years	16.52	1.48	18
Managers with 5 years	22.02	1.98	24
Total	78	7	85

Source: Author's Computation 2009

The testing of hypothesis is carried out here using the G-Test formulae as earlier stated and explained.

Table 7: G-Test Computation

Oi	Ei	Oi/Ei	ln(Oi/Ei)	Oi . In (Oi/Ei)
22	20.19	1.089	0.086	1.892
0	1.81	0	0	0
16	19.27	0.830	-0.186	-2.976
5	1.73	2.890	1.061	5.305
16	16.52	0.969	-0.031	-0.496
2	1.48	1.351	0.301	0.602
24	22.02	1.089	0.053	1.272
0	1.98	0	0	0
Total	85			5.605

Source: Author's computation 2009

$$G = 2\sum_{ij} Oij.\ln(O_{ij} / Eij$$

Or simply G= $2\sum[0 \times \ln(0/E)]$

$2\sum[0 \times \ln(0/E)] = 2(5.605) = 11.21$

Observed G = 11.21

d.f = (r-1) (c-1)
= (4-1) (2 -1)
= 3 x 1

Critical value is 7.815

From the above computation, the observed value of G = 11.21 is greater than the critical value 7.815. As a result of this, the null hypothesis (Ho) which states that motivation does not have positive impact on employee performance in the banking industry is therefore rejected. The alternative hypothesis (Hi) which states that motivation has positive impact on employee performance in the banking industry is accepted. This means that a good motivation package will bring about strong and sustained overall performance of employees.

Conclusion and Recommendations

Organizations often fail because of poor management. For this reason an organization, no matter how potentially viable it may be, is worth no more than the quality of its managers. It is they who determine whether our social and economic institutions serve us well or whether they squander our talents and resources. Decision making in view of Yalokwu (2006), is an important aspect of the managerial role in organizations. The managerial concept of break-even analysis seeks to find the quantity of output that just covers all costs so that no loss is generated. Managers can determine the minimum quantity of sales at which the company would avoid a loss in the production of a given good. If a product cannot cover its own costs, it inherently reduces the profitability of the firm. In effect, breakeven analysis enable business managers to make effective decisions based on sound rational basis and on cost information and other limiting factors. As well, it gives the manager how he can improve profitability of the business as a whole in a dynamic and uncertain market place by monitoring cost and improving the efficiency of the organization on a continuous basis. In spite of the limitations/restrictions, the breakeven analysis is very useful in planning and controlling. The information it provides may not be precisely accurate, but it usually accurate enough to justify its use as a decision making tool and as a control device. Break-even analysis is a very useful tool because it can help you understand the sources of profit in your business. It is a useful tool because it helps managers to estimate the outcome of their plans. Calculating the break-even point (through break-even analysis) can provide a simple, yet powerful quantitative tool for managers. Managers can use this information in making a wide range of business, decisions, including setting prices, preparing competitive bids, and applying for loans. While many at times it is assumed that the producer is a manufacturer (i.e., labour and materials), break-even analysis may be even more important for service industries. The reason for this lies in the basic difference in goods and services: services cannot be placed in inventory for later sale. What is a variable cost in manufacturing may necessarily be a fixed cost in services. Whatever method is used, the goal of these service industries according to Enotes.com Inc (2009), is the same as that in manufacturing: reduce fixed costs to lower the break-even point.

In line with the assertion made by the literature and the evidence gathered in the process of the study, the following recommendations are made:

1. Breakeven analysis can be used not only for manufacturing companies, but also for companies that provide services. The issue to note here is that, what is a variable cost in manufacturing may necessarily be a fixed cost in services. Whatever method is used, the goal of these service industries according to Enotes.com Inc (2009), is the same as that in manufacturing: reduce fixed costs to lower the break-even point.
2. In using breakeven analysis in decision making all the information which is relevant must be available.
3. To effectively use break-even analysis in decision making all the data must be expressed in monetary value and relating to costs and revenues as measured by the management accountant.

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