APPLICATION OF QUANTITATIVE TECHNIQUES IN SMALL BUSINESS MANAGEMENT IN SUB-SAHARAN AFRICAN STATE

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ABSTRACT

The study examines the application of quantitative techniques in small scale business management in Anambra State, Nigeria. A sample of 225 managers of small scale business in Anambra State determined at 5% level of significance for sample error, using Eastman Kodak’s sample size for inventory formula was selected from a population of 12,627 managers using stratified random sampling method for the purpose of questionnaire administration. Z-Test Statistic was conducted to test the significance between the impact of information communication technology in small scale business in Anambra State and the use of quantitative techniques; quantitative techniques usage and business decision areas. The results of this study reveal that there is no significant variation between the impact of information communication technology and the use of quantitative techniques in small scale business in Anambra State, Nigeria. Further result revealed that there is no significant variation between business decision areas and quantitative techniques application. Such business decision areas include; production, marketing, advertising, packaging and finance. It is recommended that subjective approach be avoided as much as possible especially where records are available. This paper calls for government intervention in making quantitative techniques a compulsory subject in schools for sustainable development since quantitative techniques is used to quantify variables in any discipline.


1. INTRODUCTION

The world has grown beyond gambling with it crudest notation of unplanned chance game. The new thinking is how business can survive through programmed change and proactive ingenuity of business manager’s in the face of globalization (Anyanwakoro, 2009). Information, in the wake of globalization may not be in short supply, but the astuteness of the manager is being proactive and taking timely and accurate decision determines the wellness...
of the business firm (Orga and Ogbo, 2012). Anambra State of Nigeria which is a typical Sub-Saharan African State for this study is a major commercial and industrial nerve centre of Nigeria (Idemobi, 2012). According to Anambra State Handbook (2002), one of the special characteristics of Anambrarian’s are the immense resourcefulness of its people who carry on most animated business relationship with people everywhere in Nigeria. Thus, Akpala (1984) study on the problems and prospects of unionization in the traditional sector indicated that Igbo philosophy of individualism has over the years encouraged the preponderance of small scale enterprises in South-East of Nigeria.

Many small scale business forms and indeed big firms survive where others fail. The reason for failure or survival of firms is based on the quality of decisions by the managers / owners (Okeke, 2009). In this era of globalization, and information and communication technology, the World has turned to a village and only informed decisions can ensure that firms navigate, survive and thrive. Decision are hardly taken on the basis of certainty and no man claims absolute knowledge of all the variables or the probability of all the variables that impinge on a decision but decisions are still made on daily basis. These decisions affect human capital, machine, information technology, finance and materials which are the resources of any firm.

2. Review of Related Literature

Variables and or outcome cannot be known with certainty, the probability of each variable or outcome may be determined to aid decision and decision process. Probability theory, an aspect of quantitative techniques which are the chance of an uncertain event happening can be learned and applied in business (Sims in Orga and Ogbo, 2012). It is common knowledge as Olagunju (2005) reiterates that any attempt made to reduce the level of uncertainty in decision making process will to a large extent increase the chances of intelligent and well-informed decision. Since there is considerable uncertainty in decision making, it is important all the known risk involved be scientifically evaluated. The implication is that decision and outcome should not be left to chance where information or data are available, a secure approach should be so scientifically analyze them. This presupposes a procedural approach which leads itself to replication. Therefore successful business decision rely on quantitative method to narrow possibilities and help predict what options will have the greatest chance of success (Acevedo, 2014).
2.1 Conceptual Review

There is no single criterion for classifying business enterprises as small or medium scale business globally. Evidence from literature as indicated by Olabisi et al. in Onukwuli (2014) shows that in defining small scale business reference is usually made to some quantifiable measures such as number of people employed by the enterprises, investment outlay, the annual turnover (sales) and the asset value of the enterprises or combination of these measures. However, for this study we adopt Olayiwola and Ogunlede (2010) opinion that a small scale industry is an industry with labour size of between 11-100 and a total cost of not more than ₦50 million.

According to Akingbade et al. in Ighomereho (2013) quantitative techniques is a problem-solving science based activity using analysis and modeling as a basis for decision makers in organizations to improve the performance of the operation under their control. Ighomereho (2013) opined that quantitative techniques is a problem solving and decision making techniques to aid and improve managerial decision making. Indeed, it is a kit of scientific and programmable rules that provide manager at all level with a quantitative basis for decision making. More so, Murugesan (2011), views quantitative techniques as a method used to qualify the variables in any discipline. It means the application of subject like mathematics and statistics, econometrics and operation research to understand and solve problem.

Small businesses are prone to chance occurrences while changes affect small business quickly. Information communication and technology has affected small scale business adversely as information overload has afforded many small scale business operators little chance to adjust between changes. It is however expected that internal factors of management and sound decision may increase the life span of small scale business firms. According to Nickels, McHuhg and McHugh (2002), best decisions are based on sound information. Managers deciding rationally must have a clear understanding of the alternative course by which goals can be achieved under existing circumstances and limitations. They must also have the information and the ability to analyze and evaluate alternatives and also be eager to choose the best solution by selecting the alternative that most effectively satisfies goal achievement (Weihrich and Koontz, 2005). However, quantitative techniques do not result in decision but it generates enough quantified data to direct the decision maker to be the most plausible decision. According to Acevedo (2014) successful business decision rely on quantitative methods to narrow possibilities and predict what options will have the greater chance of success. Whether you are making purchasing, marketing or financing decision, it is
essential to obtain a quantitative foundation to assist in the decision making process. Therefore quantitative techniques use survey, tests, experiment and other data gathering methods to assemble information.

2.2 Theoretical Review

The study anchored on the ‘Working Back Process Principle’ or ‘Richard Bell Principles of Programming Optimality’ as in Lucas (1979). The Bellman’s principles of optimality states that an optimal policy implies, that whatever the initial state and initial decision, the remaining decisions must be optimal, with regard to the state resulting from the first decision. The significance of this theory to the study is that quantitative techniques are indispensible to modern business analysis that no one completely figure blind can afford to remain comfortable in the field in the years to come. There is no aspect of organizational management that has not now gone quantitative.

2.3 Empirical Review

Orga and Ogbo, (2012) work on the application of quantitative techniques in small business management in Nigeria indicated that probability theory has a wide application in small business firms; probability shows specificity in business situations and is inevitable in this era of information overload caused by ICT. Murdock (2014) studies on the application of quantitative techniques in business decision making. Results shown that quantitative techniques use tests, experiments and other data gathering to assemble information and facts gathered in this way can be used to help make decisions about marketing, advertising, packaging, assembly financial decision.

This study was necessitated by the high mortality rate of small scale industries including manufacturing firms. Scholars have indicated that over 70% of small and medium enterprises in the studied area (the South-East of Nigeria) die within five years of establishment (Idemobi in Idemobi 2012; Ilo in Olabisi et al. 2013). Government demolition of illegal structures and revocation of lands, high cost of lending and general economic meltdown or global financial crises combined to make the establishment and profitable operation of a small enterprise a mirage/an illusion (Orga and Ogbo 2012). It is however expected that internal factors of management and sound decision may increase the life span of small business firms. The quantitative technique estimates resulting from accurate record keeping and analysis of data will elongate the life span of small firms in Nigeria. The
The statement of problem is to locate the extent of which application of quantitative techniques has contributed to decision making in small scale business in Anambra State, Nigeria.

The main object of the study is to explore the application areas of quantitative techniques to small scale businesses in Anambra State. The specific objectives are:

1. Identify the impact of ICT on the use of quantitative techniques in small scale industries in Anambra State, Nigeria.
2. Identify the areas of application of quantitative techniques in small scale business in Anambra State, Nigeria.

The study undertakes to examine the following research question:

1. What are the impacts of ICT on the use of quantitative techniques in small scale business in Anambra State, Nigeria?
2. What are the application areas of quantitative techniques in small scale business in Anambra State, Nigeria?

Arising from the background study, subsequent objectives of the study and research questions, the following hypothesis were generated and tested:

**Ho1:** There is no significant variation between the impact of ICT and the use of quantitative techniques in small scale business in Anambra State, Nigeria.

**Ho2:** There is no significant variation between business decision areas and use of quantitative techniques in small scale business in Anambra State, Nigeria.

### 3. Materials and Methods

The survey research design method was used in the study. The population of the study consists of all small scale enterprises that engaged in productive venture in Anambra State, according to Olayiwola and Ogundele (2010) the size of business that fall into this category are those that employ between (11) and one hundred (100). Statistics provide from the registry business and social development offices in the 21 local government council headquarters of Anambra State show that the population of this level of small scale enterprises still operating in this area is twelve thousand six hundred and twenty-four (12,624). A sample size of 225 participants determined at 5% level of significance for sample error using Eastman Kodaks sample size for inventory population formular (Imaga, 2003) was selected using proportionate stratified random sampling method for purpose of questionnaire administration.

The instrument used in the study is close-ended questionnaire. The questionnaire comprises of two sections with 8 items. The scale used to measure items had already been constructed,
used and tested by Orga and Ogbo (2012). Each scale modified to four point liker-scale items. Degree of agreement varies from 1-4 representing “1” for undecided, “2” for no impact, “3” for little impact and “4” for great impact. Orga and Ogbo (2012) disclosed reliability by pilot survey using Pearson’s product moment coefficients of correlation which yield 0.85 for the impacts of ICT on the use of quantitative techniques in small scale business in Anambra State.

4. Results

The research questions formulates for the study were analyzed using table, frequencies and percentages while Z-test Statistic was used to test the hypothesis. In other to answer research question one which states, “What are the impacts of ICT on the use of quantitative techniques in small scale business in Anambra State. Result shows that 194 (86.22%) of the CEOs accept that ICT has great impact on quantitative techniques; (20) 8.89% of the opinion believe that ICT has little impact while, (10) 4.44% believe ICT has no impact and (11) 0.44% were undecided.

To answer the research question two which state, “What are the areas of application of quantitative techniques by small scale business in Anambra State”. Result of analysis shows that 194 (86.22%) of the respondents (CEOs) were of the opinion that quantitative techniques is applied in marketing; while 90 (40%) indicated it should be applied in advertising. Also 112 (49.78%) and 190 (84.44%) insisted that the best area to apply quantitative techniques was in packaging and finance respectively. Hypothesis one states, “There is no significant variation between the impact of ICT on small business in Anambra State and the use of quantitative techniques”. To test the hypothesis and significance, Z-test statistic was used and the summary of results is shown in Table one below.

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>Significance</th>
<th>Z-Statistic values</th>
<th>Decision rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact of ICT and the use of quantitative techniques</td>
<td>225</td>
<td>0.05</td>
<td>0.024</td>
<td>±1.96</td>
</tr>
</tbody>
</table>

Source: Results of empirical data, 2014.
Table 1 above, shows that a, \( \pm Z \left( \frac{0.024}{2} \right) \) is required for significance (two tail test). Since the calculated \( Z \) (0.024) is less than critical \( Z \) (\( \pm 1.96 \)), we accept the null hypothesis and conclude that there is no significant relationship between the impact of ICT and the use of quantitative techniques in small scale industry in Anambra State.

The second hypothesis states, “There is no significant variation between business decisions areas and the use of quantitative techniques. Z-test statistic was used to test the hypothesis and the summary of results is shown in Table two below.

Table 2: Summary results of Z-test statistic and significance between quantitative techniques usage and business decision.

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>Significance</th>
<th>Z-Statistic values</th>
<th>Decision rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>areas of quantitative techniques usage and business decision</td>
<td>225</td>
<td>0.05</td>
<td>0.11</td>
<td>( \pm 1.96 ) Accepted</td>
</tr>
</tbody>
</table>

Source: Results of empirical data, 2014.

Table 1 above, shows that a, \( \pm Z \left( \frac{0.024}{2} \right) \) is required for significance (two tail test). Since the calculated \( Z \) (0.11) is less than critical \( Z \) (\( \pm 1.96 \)), we accept the null hypothesis and conclude that there is no significant variation between quantitative techniques and business decisions areas in small scale industry in Anambra State, Nigeria.

5. Discussion of Results

The first hypothesis which states that “There is no significant variation between the impact of ICT in small business in Anambra State and the use of quantitative techniques” was accepted. The finding has collaborated with the work of Orga and Ogbo (2012) that the rate of change in the economy was further heightened by ICT, since changes occur almost on hourly basis and there is need for executive information system and the use of quantitative techniques approach.

The second hypothesis states, “There is no significant variation between business decisions areas and the use of quantitative techniques. The finding of this study agrees with the work of Murdock (2014) on the applications of quantitative techniques in business decision making. Result shows that quantitative techniques use surveys, tests, experiments and other data
gathering to assemble information and facts gathered in this way can help make decisions about marketing, advertising, packaging, assembly techniques and financial decision. The findings of this study can be a handy tool which could be used to provide solution to organizational conflict especially entrepreneurs and small scale business that has resulted from poor decision making. Therefore, both gathering and analyzing information is crucial to applying quantitative techniques to good business decisions. The study is only limited to selected small scale industries in Anambra State. It is pertinent at this juncture to suggest other researcher should be conducted on other Sub-Saharan African States and other constraints which could lead to non application of quantitative techniques by small scale industries in Anambra State, Nigeria.

6. Conclusion and Recommendation

The importance of quantitative techniques in business decision making cannot be overemphasized especially in areas of finance, advertising, marketing, production and practically every aspect of daily upkeep of organizations. Going by the findings of this study it can easily be inferred that successful business decisions rely on quantitative methods to narrow possibilities and help predict what options will have the greatest chance of success. It is imperative for small scale organizations to consider business environment as always unpredictable and can throw up unusual situation. Information and communication technology has affected small business adversely as information overload has afforded many small business operators little chance to adjust between changes.

It is recommended that subjective approach be avoided as much as possible especially where records are available and kept. There should be access by small scale business to internet facilities to improve information gathering and adequate knowledge of quantitative techniques be amassed to ensure that business decisions are not left to chance. This paper calls for government intervention in making quantitative techniques a compulsory subject in schools for sustainable development since quantitative techniques is used to quantify variables in any discipline.
REFERENCES