

## **Adoption of Appraisal Techniques in Real Assets Investment Decisions by MSMEs: Empirical Evidence from Lafia and Abuja in North Central Zone, Nigeria**

**<sup>1</sup>Ogbulu, O.M., <sup>2</sup>Udensi, C.E., <sup>3</sup>Okanta, S.U., <sup>4</sup>Uruakpa, P.C., <sup>5</sup>Onoh John & <sup>6\*</sup>Paul Ndubuisi**

<sup>1, 3, 4, 5, 6</sup>Department of Banking and Finance, Abia State University, Uturu, Nigeria

<sup>2</sup>Department of Management, Abia State University, Uturu, Nigeria

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### **Abstract**

*Micro, small, and medium-scale enterprises (MSMEs) are fundamentally critical to the development and growth of both advanced and less-advanced economies, Nigeria inclusive. Consequently, governments and transnational institutions have pursued policies and programmes designed to guarantee the effectiveness and sustainability of MSMEs. But despite the efforts of both governments and transnational institutions, the actualization of the strategic roles of MSMEs remains a source of controversial narratives. For instance, it is regrettable that the several policy reforms ranging from funding to ease of doing business undertaken by the Nigerian government have not translated to significant improvements in the growth and contributions of MSMEs. Based on a descriptive survey of 201 MSMEs in two cities, Lafia and Abuja (FCT) in North-Central zone, Nigeria, the study focused on managerial competencies with emphasis on the adoption of capital appraisal techniques in making investment decisions by operators of MSMEs. Specifically, the study investigated the level of awareness and extent of usage of the techniques among operators of MSMEs and the dominant factors influencing MSMEs' use of investment appraisal techniques. The data generated from the survey were tested with descriptive statistics while multinomial and ordinal logistic regressions were employed to test the hypotheses. The findings of the study revealed that there is low level of awareness as well as low extent of usage of capital appraisal techniques on the part of MSME operators. In addition, the authors concluded that despite the immense advantages of investment appraisal techniques as a rational method of decision-making, it is surprising that there is a low level of propensity on the part of MSME operators in the North-Central zone of the country to adopt appraisal techniques. This indicates some underlying need for policy review that will give commensurate attention to the development of managerial competencies, particularly the adoption of rational methods of decision-making as one of the elements of the environment of MSMEs.*

**Keywords:** *Investment appraisal techniques, real asset investment and MSMEs*

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## 1.0 Introduction

A large percentage of commercial activities in modern economies are driven by the private sector which is mostly made up of Micro, Small and Medium-Scale Enterprises (MSMEs). Through employment generation, increase in aggregate output and reduction in disparity in income distribution, MSMEs create wealth and reduce poverty. Unlike their larger counterparts in the private sector, MSMEs have the attribute of flexibility in business decisions, and as noted by Gupta and Barua (2016) this enables them to quickly evolve innovative techniques to solve long-term business problems in the face of competition within the limitations of their resources. The significance of MSMEs as drivers of economic growth in improving national productivity and competitiveness is universally recognized. As a matter of fact, it is clearly embodied in the MSME national policy in Nigeria. However, despite the importance attached to the contributions of MSMEs, there is no consensus among various writers on the specific contribution of MSMEs to economic growth in Nigeria (Ogbulu, 1999). There are many reports on the assessments made in the many studies regarding the performance of MSMEs in Nigeria, and this weakness is evident in the low impact they have on other economic sectors. There is no doubt about the importance of decision-making competencies to managerial cum organizational success. While the government has been unrelenting in the pursuit of appropriate interventions towards actualizing the potentials of MSMEs, the policy thrust tends to give more attention to the issues of the MSME environment such as funding and infrastructure and less on entrepreneurial competencies such as decision making.

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<sup>6\*</sup> We fondly remember our member, Prof Paul Ndubuisi, who passed away during this research. Understandably, the role of effective decision making in entrepreneurial and corporate success cannot be over-emphasized. Ordinarily, there are two significant methods of decision-making - rational and non-rational. While the rational approaches, as embodied in decision theory, are factual, logical, objective, and reliable, the non-rational approach, which includes heuristics, is non-factual, subjective, non-logical, and unreliable. Nonrational approaches include experience, gut feeling, intuition, and hunch. Though these approaches have their merits and demerits, it is generally recognized that the rational approach, which includes capital budgeting and other quantitative methods, is more effective, particularly in the face of the increasing complexity of the business environment. Ironically, the more complex the environment, the greater the tendency of owners and managers of MSMEs to resort to non-rational approaches, which they consider as time saving and pragmatic. However, for MSMEs to effectively support the industrialization process of the nation and propel other sectors to growth and maturity, operators need to objectively appraise investments in real physical assets before investing in any. Appraisal techniques, or capital budgeting, entail objectively analysing and evaluating the cost and benefits of investing in a project to decide whether resources should be allocated to the project. Investment appraisal techniques are decisive in boosting corporate performance as they involve evaluating and selecting long-term investments consistent with the firm's goal of wealth maximization (Kengatharan & Diluxshan, 2017).

Farragher et al (1999) note that more accurate and reliable capital budgeting is needed by smaller firms if they are to grow, remain competitive and optimize the value of the firm. In addition, financial management theory advocates that using a sophisticated capital budgeting system enhances firms' performance. On the other hand, wrong investment decisions have dire consequences for the survival of any business, and studies have shown that one of the critical factors accounting for the high rate of business mortality in Nigeria and Africa in general is the non-adherence to sound investment decisions (Ogbulu, 1999). Effective investment decision-making is fundamental to corporate survival and the long-term success of any enterprise. It is, therefore, imperative for MSMEs to not only be familiar with investment appraisal techniques but also to make conscious efforts to religiously apply them whenever the need to decide on investment in real assets in their organizations arises. However, it is equally recognized that effective adoption of appraisal techniques depends on the possession of sound managerial competencies. Capital budgeting techniques are, without doubt, crucial in arriving at sound investment decisions in any economy. Surprisingly, this is as far as theory goes. In practice, a wide gap exists between theory and practice. No wonder there is controversy concerning the application of investment appraisal techniques by MSMEs in making investment decisions. For example, Ayodele (2010), Kerubo *et al* (2016) found in their studies that small-scale firms employ investment appraisal techniques, while researchers like Olawale *et al* (2010) and Klammer (1973) hold that small manufacturing firms do not use sophisticated investment appraisal techniques when evaluating projects. Clearly, whether promoters of MSMEs apply these project appraisal techniques in evaluating projects in Nigeria is still controversial among researchers and practitioners.

In addition, it should be noted that various policy reforms have been implemented in Nigeria over the past decades to boost the growth of the MSME subsector. Unfortunately, it is regrettable that these policy reforms which do not give commensurate attention to the key elements of MSME environment have not been translated to significant improvements in the growth of MSMEs (Ogbulu, 1999). It is in the light of the above scenario that this study becomes very imperative as a means of generating knowledge that will aid in closing the gap between theory and practice in capital budgeting. In addition, the study will provide relevant insight into the factors that motivate MSMEs to invest in real physical assets thereby helping to shape policy in the direction of boosting the growth of MSMEs in Nigeria. In this direction, the broad objective of the research was to examine whether micro, small and medium enterprises (MSMEs) use investment appraisal techniques to evaluate their real asset investment in Nigeria. The specific objectives were to:

- I. Determine the extent to which MSMEs employ investment appraisal techniques in making investment decisions.
- II. Identify the dominant socio-economic factor that influences the choice of investment appraisal techniques by MSMEs.
- III. Examine the extent to which Nigerian MSMEs are aware of investment appraisal techniques.

## 2.0 Literature Review

### 2.1: Concept of investment and investment appraisal

Ordinarily, investment refers to real physical assets, financial assets or both. Investment in real physical assets refers to the commitment of long-term funds to acquire real physical assets like land, buildings, plant and machinery, furniture and fittings, vehicles and vehicular equipment combined with other production factors to produce a given output level. Like all investments, the commitment of funds is done by the investor in anticipation of future benefits (profit), which, for many reasons, may or may not materialize as expected or desired by the investor. Herein lies one of the risks associated with investment. On the other hand, investment in financial assets refers to the commitment of funds to acquire financial assets or instruments like stocks and shares, debentures, bonds, convertibles, options, and derivatives, both public and corporate, short-term or long-term, which come in different shapes and sizes. They are the different IOUs that are created and exchanged in the financial markets between surplus and deficit units in the economy. However, a striking feature of investment in financial assets is that apart from its riskiness, which is associated with all investments, the funds raised by the economic units issuing the financial instruments are ultimately channelled to the acquisition of real physical assets to aid the production of goods and services. Nevertheless, Jifar (2020) has observed that the investment field is gradually expanding beyond trading of physical investment assets into electronic and human networking. Risks are very difficult to predict and with the expanding investment horizon comes more complex risks. Hence, there is a need to explore more sophisticated risk management models. In any case, given the element of risk inherent in all investments, it becomes imperative for any investor to properly and objectively appraise the costs and benefits of any investment opportunity before committing funds to such an investment.

Appraisal techniques refer to those techniques, procedures, processes, skills, approaches, and theories developed over time to aid in the scientific and objective evaluation and identification of the feasibility and viability of investment opportunities in the economy. Peterson and Fabozzi (2002) described capital budgeting as analyzing investment opportunities in long-term assets that are expected to produce benefits for more than one year. On their part, Brigham and Ehrhardt (2011) defined capital budgeting as the whole process of analyzing projects and deciding whether they should be included in the capital budget. The basic assumptions of capital budgeting theory are:

- The primary goal of the shareholders of a firm is the maximization of the firm's value.
- The firm is assumed to have access to perfect financial markets, allowing it to finance all value-enhancing projects.

Brealey and Myers (2003) argued that when these assumptions are met, firms can separate investment and financing decisions and should invest in all positive net present value projects. Unfortunately, however, it has been observed that some of these assumptions rarely apply to small and micro businesses (Keasey & Watson (1993).

As a systematic process, capital budgeting involves several techniques and approaches. Capital budgeting techniques are grouped into discounting, non-discounting, traditional, sophisticated and unsophisticated. The most popular distinction is between discounting and non-discounting techniques, which is based on whether such techniques consider time value of money or not in the analysis. Omolumo (2003) differentiates between traditional earnings-based techniques and the discounted cash flow (DCF) techniques which are cash flow based. Examples of traditional techniques are the Payback Period (PBP) also known as the Capital Recovery Method, Accounting Rate of Return or Average Rate of Return (ARR). On the other hand, discounting techniques include the Net Present Value Method (NPV), the Internal Rate of Return (IRR) and the Profitability Index (PI). Over time, some of these techniques have undergone some mutations to yield improved versions and hybrid. For instance, there is the Modified Internal Rate of Return (MIRR) and the Discounted Payback Period. The Discounted Payback Period is usually seen as a hybrid between the discounting and the non-discounting techniques because the method combines the attributes of both discounting and non-discounting in its formulation (Okafor, 1983). Beyond the issue of discounting, the techniques also vary in terms of their effect on the maximization of owner's wealth.

## **2.2. MSME in focus**

The OECD (2018) notes that SMEs are a dynamic and evolving population, that is very diverse in terms of age, size, business model, performance, and the profile and aspirations of entrepreneurs. It is equally noted that better understanding of the heterogeneity of SME population is critical for countries, regions and cities to support the right business conditions and capitalize on their many diverse small businesses (OECD 2019). It should be pointed out that the classification of business organizations as micro, small, medium or large organizations can be a very herculean task given that there is yet no consensus or uniformity in the parameters and/or benchmarks that could be adopted in achieving such an exercise. This notwithstanding, some attempts have been made by different international and national bodies to streamline the definitional challenge. For instance, the International Labour Organization (ILO, 1999) defines micro enterprises as those enterprises with an asset base of not more than N1.5 million excluding the cost of land but including working capital and a staff strength of not more than ten (10). Small scale enterprises refer to those enterprises with asset base of more than ₦1.5 million but not in excess of ₦50 million excluding cost of land, but including working capital and/or a staff strength from 11 to 100. Medium-scale businesses are enterprises with asset base of more than ₦50 million, but not over ₦200 million excluding cost of land but including working capital and/or a staff strength of between 101 to 300 while large-scale are enterprises with asset base of over ₦200 million excluding cost of land but including working capital and/or a staff strength of more than 300.

On the other hand, the Small and Medium Enterprises Development Agency of Nigeria (SMEDAN, 2020) has in line with the dual criteria of employment and assets provided in the National Policy on MSMEs defined Micro, Small and Medium Enterprises (MSMEs) as summarized in Table 1.

**Table 1: Classification of MSMEs based on employment and assets**

Category	Employment	Asset (excluding land and building)
Micro enterprise	<10 employees	< <del>₦</del> 5million
Small enterprise	10 - 49 employees	> <del>₦</del> 5 but ≤ <del>₦</del> 50 million
Medium enterprise	50 – 199	> <del>₦</del> 50 but ≤ <del>₦</del> 500

**Source: National Policy on MSMEs (2017 – 2025)**

Perhaps it is necessary to point out that the Policy recognizes that where there is a conflict in the classification criteria, employment should take precedence. For this study, the researchers have decided to adopt the classification given by SMEDAN.

### 2.3: Environment of MSMEs

The United Nations Industrial Development Organization (UNIDO, 2017) defines business environment as the set of conditions outside a firm’s control that significantly influence how businesses behave throughout their life cycle. Every business, notwithstanding the size, operates in an environment that embodies both macroeconomic and microeconomic factors that determine the firm's chances of survival. In this direction, policymakers and scholars are concerned about not just any environment but an enabling and conducive environment. That is an environment that is conducive for the sustainable development of the firm. The MSME environment, based on the Organization for Economic Cooperation & development (OECD, 2018) model comprises four key components, viz - institutional and regulatory framework, access to markets, entrepreneurial culture and access to resources. The institutional/regulatory framework comprises taxation, regulation, competition, court and legal issues and public governance. The second component, access to markets, focuses on - domestic demand conditions, trade and investment policies, public procurement, and infrastructure. The third component, entrepreneurial culture, has the following elements - opportunities, abilities, and attitudes. Lastly, the fourth component, access to resources, focuses on finance, energy, knowledge, technology and innovation, human capital, and skills development. These elements interact dynamically to engender a business-enabling environment that varies from locality to locality. However, our key interest in this study is the entrepreneurial culture and particularly the element of abilities which focuses on the entrepreneur or owner manager and their managerial competencies which include decision making. It is an established fact that decision-making competencies are not only critical to corporate success but are also significant in corporate competitiveness.

### 3.0. Empirical review

Researches into the use of capital appraisal techniques focus on such dimensions as level of awareness, rate of usage, impact, types of techniques, factors that influence choice of techniques, etc. However, one significant point about the researches is the lack of agreement on the direction of the variable of interest. A review of some of the studies follows. Ayodele (2010) examined how

far SMEs in Nigeria use analytical techniques in project appraisal and the effect of such practice on firms' investment performance. The findings of the study indicated that firms in Nigeria adopt analytical appraisal techniques and that the Payback Period is more popular than others. Olawale *et al* (2010) investigated the impact of investment appraisal techniques on the profitability of small manufacturing firms in the Nelson Mandela Bay area of the Eastern Cape Province, South Africa. The researchers noted that small manufacturing firms' owners do not use sophisticated investment appraisal techniques when evaluating their proposed projects. In addition, based on multiple regression analysis, they confirmed the significant impact of investment appraisal techniques on the profitability of small manufacturing firms. The authors equally noted that the use of non-sophisticated investment appraisal techniques has a negative impact on the profitability of small firms. Gupta and Jain's (2016) study focused on the use of capital budgeting techniques for long-term capital investment decisions by selected SMEs in Haryana. The major finding of the study was that only a small percentage of firms use capital budgets for long term decisions.

Barjaktarović *et al* (2015) investigated the capital budgeting techniques implemented by small and medium-sized enterprises in Serbia. The study sought to determine if payback criterion was the dominant investment evaluation technique and whether micro, small and medium-sized companies in Serbia were mostly inclined to determine the cost of capital following the historical returns on investments. The findings were that the payback period was the dominant technique used by the firms and that the firms utilized the historical returns on investment in determining the cost of capital. In their study, Mogwambo *et al* (2015) examined the contribution of investment appraisal techniques to efficient portfolio selection in the soft drinks industry in Kenya. Findings of the study indicated a strong correlation between investment appraisal techniques and investment alternatives with investment appraisal accounting for 85.7% of investments alternatives. Furthermore, the ranking of the investment alternatives was influenced by the type of investment appraisal tools applied, while a significant relationship exists between investment appraisal techniques and portfolio efficiency. In addition, path analyses of the investment appraisal techniques on portfolio efficiency show that PBP has a higher significant relationship with portfolio efficiency. Hence the researchers further noted that investment appraisal techniques influence efficient portfolio selection in the soft drink industry in Kenya.

In another study, Kerubo *et al* (2016) investigated the influence of investment appraisal techniques on financial performance of small manufacturing firms in Kisii town, Kisii County, Kenya. The findings of the study revealed that small manufacturing firms largely rely on non-discounting investment appraisal methods to assess their investments in the industry, which in turn affects their performance. In addition, investment appraisal techniques had a positive relationship with financial performance of small manufacturing firms. The study by Kengatharan and Diluxshan (2017) examined the relationship between the use of capital investment appraisal practices and effectiveness of investment decision of listed manufacturing companies in Sri Lanka. They employed a field survey from January to March 2017, and primary data were collected through self-administered questionnaire from 20 of randomly selected manufacturing companies. Results of the study revealed that the use of NPV and IRR has a significant and positive relationship with the effectiveness of investment decisions. However, risk analysis techniques were not significantly

related to investment decision effectiveness. Sungun (2015) investigated capital investment decisions in small and medium-sized enterprises in Turkey. The study, which focused on how capital investment decisions are made in SMEs in Turkey, was based on a descriptive survey of 65 medium and small-scale enterprises. Data were obtained through interviews and questionnaire. Based on simple percentages, the researcher discovered that the majority of the MSEs were aware of investment appraisal techniques, but only a small fraction used them.

### **3.0: Methodology**

The study used primary data mainly and secondary data. Primary data as provided by the respondents were critical to the understanding of the experiences of the respondents. As a result, and given the nature of the phenomenon of interest, it adopted explanatory and survey research design. The explanatory and cross-sectional survey utilized self-reporting questionnaire to elicit data from the respondents. The use of questionnaire was further necessitated by the sample size of micro, small and medium enterprises (MSMEs) drawn from the two cities (Abuja and Lafia) in the north-central political zone. While Abuja is the federal capital territory, Lafia is the capital of Nasarawa state. The questionnaire has both structured and open-ended questions that elicited individual opinions on the key variables of the study. The structured questions ranged from 3-point to 5-point Likert scales. The instrument was administered by hand through research assistants who offered assistance to the respondents in the course of filling the survey instrument. In choosing research assistants consideration was given to those who were familiar with not only the terrain but also with the fundamentals of survey research. Apart from that, the research assistants underwent some training. The training focused on developing the basic skills required to effectively engage a respondent. In addition, the training provided opportunities to build necessary understanding and familiarity with the items of the questionnaire. The collection of the questionnaire was done at the spot with the assistance of the research assistants for those who needed help. But there were repeat calls for well-informed respondents. The administration of the instrument took four months. A pilot study was conducted using a pilot sample drawn from Aba in Abia State. This was necessary to ensure the reliability and validity of our research instrument. The split-half technique was employed to test for the reliability and the output is shown in table 3. below. The values of both Spearman-Brown and Guttman coefficients are high and within the acceptable range of reliability measure. In terms of validity, the entire process of preparing and constructing the questionnaire was subjected to multiple levels of evaluation beginning from the team members' peer review (individual and collective assessment) to expert evaluation by lecturers in the department of Measurement & Evaluation (Faculty of Education) to achieve both content and face validity. In addition, construct validity was determined based on past research works and extant theory. This is in line with Moser and Kalton's (1997:356) observation that the essence of construct validity is its dependence on theory and the examination of the observed associations is as much a test of the theory as of the scale's validity. Another factor that strengthened the validity of the instrument is the fact that the variables of the topic have general applicability and some of the variables of interest had been investigated in the past.



Table 2.0: Reliability coefficients based on Split-half method

S/No.	VARIABLES	No. of items	Spearman-Brown coefficient		Guttman Split-half coefficient
			Equal length	Unequal length	
1	Extent of usage	5	.894	.897	.862
2	Dominant factors	5	.840	.844	.804
3	Extent of awareness	5	.749	.755	.715

The determination of the sample size was done through both scientific (probability) and non-scientific (non-probability) methods and this was due largely to the differences that exist among the components of the MSMEs. For instance, while medium and to some extent small businesses operate in the formal sector, micro businesses operate in the informal sector. Micro businesses are neither registered nor do they have an association. Even in the instance where a fledgling association (registered with the State Ministry of Commerce) existed, efforts to get the list of members failed. Another significant point to note is that the registers of members obtained from Chambers of Commerce and the National Association of Small-Scale Industrialists (NASSI) in some of the States were not current - there were so many names of firms that had gone into extinction (are no longer in existence). Arising from the above, the determination of the sample size was first stratified and thereafter Krejcie and Morgan's formula for finite population was used to determine the sample size for medium and small-scale businesses based on the membership registers from Chambers of Commerce and Industry and NASSI as the population frame. On the other hand, because the population of micro firms was unknown the sample size was determined based on non-probability method (Cochran's formula for infinite population). However, the actual identification and selection of the firms was conveniently done. The sample sizes for Abuja and Lafia were 178 and 152 respectively. The data were analyzed with descriptive statistics, frequency distribution, graphs, weighted average index and charts. In addition, ANOVA, regression (ordinal and multinomial), generalized linear model and kruskal- Wallis test were used in testing the hypotheses on SPSS software package.

## 4.0 RESULTS

### 4.1 Presentation and analysis of data

This section focuses on the presentation and analysis of data generated from the field survey. It equally covers hypotheses testing and discussion of findings. A total of three hundred copies of the questionnaire were distributed out of which two hundred and one representing 67% were returned. The analysis of some basic attributes of the businesses such as type of business, educational qualification of the operators, total asset, expenditure on equipment and frequency of risk analysis of investments are presented.

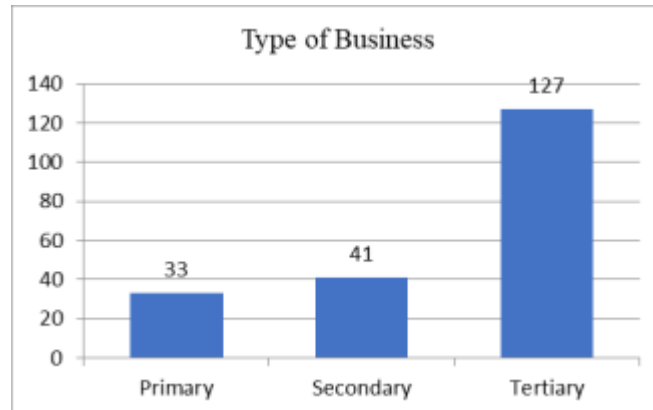


Fig 1: Types of Businesses  
Source: Field work, 2022

Fig.1 shows the distribution of the firms in terms of the basic classification of business operations into primary (extractive), secondary (manufacturing) and tertiary (service). The service sector has the highest number of firms (127 or 63%) followed by manufacturing (41 or 20%) and extraction (33 or 17%). Clearly majority of the respondent firms were service organizations.

Fig 2 is a pie chart showing the distribution of the educational qualifications of the operators of the firms. The data show that majority (101 or 50%) of the operators of MSMEs possess either a degree or HND. They are followed by 81 (or 37%) WASC holders; Master's degree holders (27 or 11%) and lastly 3 (representing 2%) doctorate degree holders.

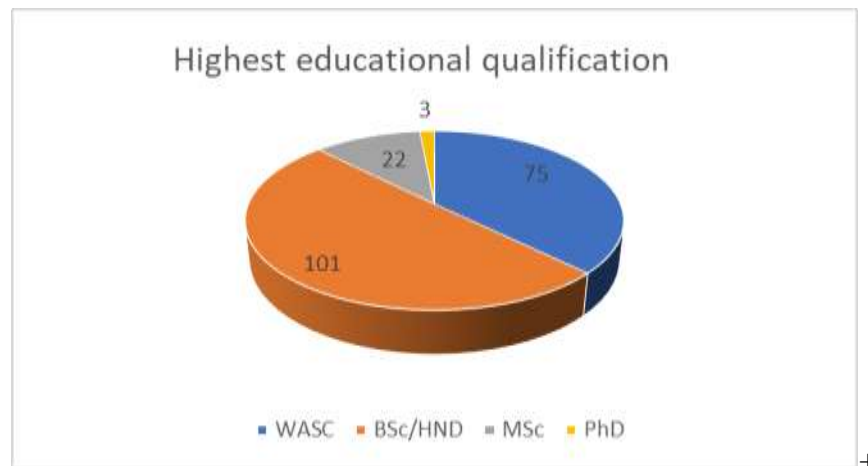


Fig. 2: Distribution of the highest educational qualification of respondents  
Source: field work 2022

Fig. 3 shows the distribution of the firms based on total asset which is one of the parameters for categorizing MSMEs. The distribution of the firms is as follows: firms with asset base of less than N10m (112 or 56%), N11-N20m (35 or 17%); N21 – N30m (17 or 9%); N31m -N40m (12 or 6

%) and greater than N40m (23 or 12 %). Interestingly, while firms with a total asset base of less than N10million naira were in the majority, firms with asset base of more than N40million ranked third. The least number of firms had a total asset base of between N31 and N4o million naira.

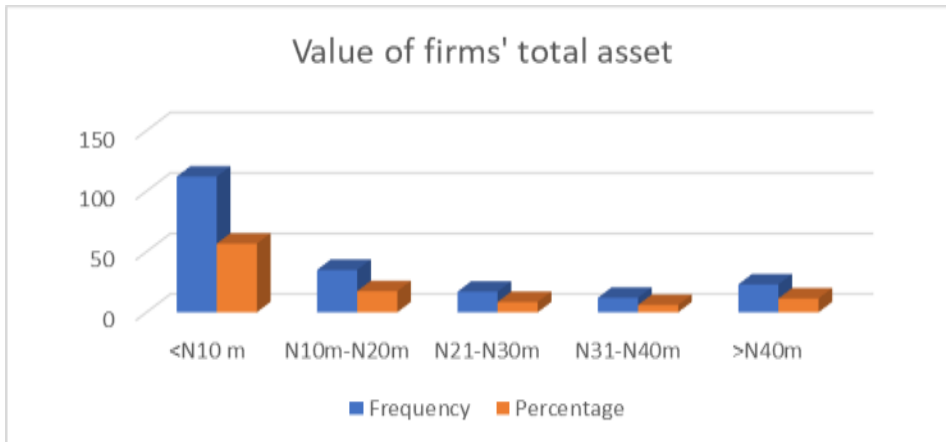


Fig. 2. Classification of the firms based on total asset

Fig. 3: Distribution of firms based on value of total assets

Source: Field work 2022

On the basis of number of employees which is one of the criteria for classifying MSMEs by the Central Bank of Nigeria and other national and international agencies fig. 4 clearly shows that firms with less than 10 employees were in the majority (133 or 66.2%). This was followed by firms with between 10 and 30 employees which were 41 or 20.4%. The last group covers firms with number of employees that was above 30 and has 27 firms which represents 13.4% of the sample.

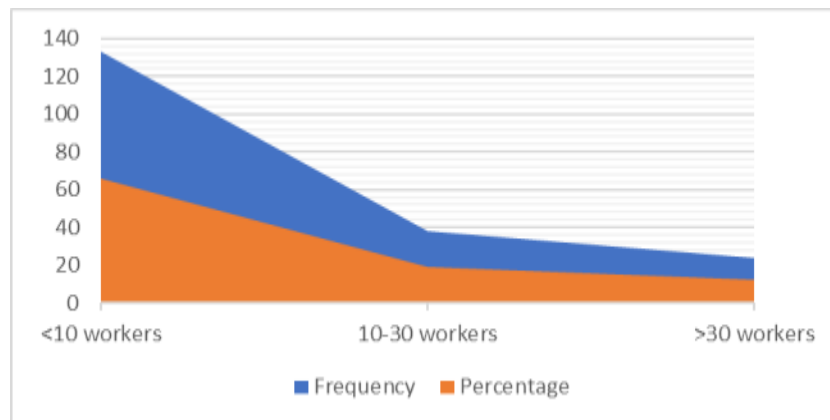


Fig. 4: Personnel size of the firms

Source: Field work.

Fig 5 shows the distribution of degree of engagement in formal risk analysis by the operators of MSMEs. The data show that while majority of the firms (79 or 40.3%) always engage in formal

risk analysis, 68 firms representing 34.7% sometimes carried out formal risk analysis. On the other hand, 49 firms representing 25% were never involved in formal risk analysis.

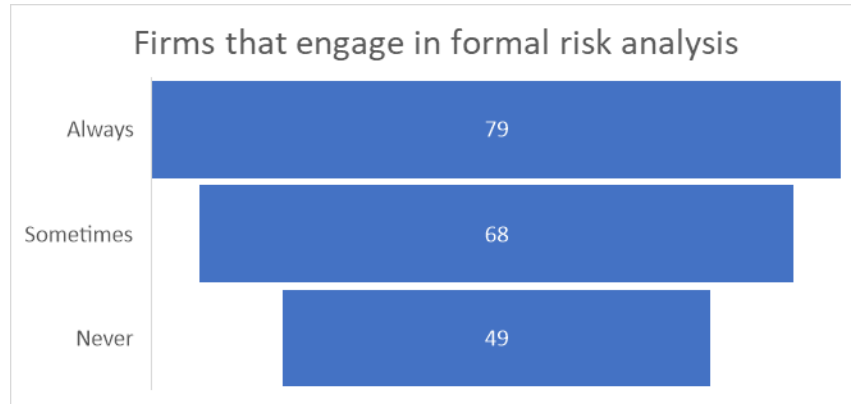


Fig.5: Distribution of firms that engage in formal risk analysis

Source: Field work 2022

Another important parameter in the classification of MSMEs is the total expenditure on equipment and the data on the focus firms are shown in fig 6. The pie chart shows that: majority (95 or 48%) of the MSMEs fall within the less than N1 million category; 49 or 25% spent between ₦1- ₦2.5 million on equipment; 22 or 11% spent between N2.6 and N5million; and 33 or 16% spent above N5million during the year in focus.



Fig 6: Distribution of expenditure on equipment by the firms

Source: Field work 2022.

## 5.2: Hypothesis Testing

Objective 1: To determine the extent to which MSMEs employ Investment Appraisal Technique .In this section, the research objectives were transformed into five hypotheses and carried out statistical tests. It is necessary to point out that objectives sought to determine the extent to which MSMEs use the following appraisal techniques – payback period (PBP), internal rate of return (IRR), net present value (NPV), accounting rate of return (ARR) and profit index (PI) in evaluating their real asset investments. In order to determine the predominant degree we assessed the relationship between frequency of engagement in formal risk analysis (as response variable) and

extent of usage of the appraisal techniques as predictor variable). In addition, we carried out a Kruskal-Wallis test to determine if differences exist among the three groups of firms – micro, small and medium firms in their usage of the techniques. The five objectives that specifically focused on the extent of usage of the techniques were transformed into five hypotheses and tested with ordinal logistic regression thus:

HO1: MSMEs do not to a large extent employ Payback Period as an investment appraisal technique.

HO 2: MSMEs do not to a large extent employ Internal Rate of Return as an investment appraisal technique.

HO3: MSMEs do not to a large extent employ Net Present Value as an investment appraisal technique.

HO4: MSMEs do not to a large extent employ Accounting Rate of Return as an investment appraisal technique.

HO5: MSMEs do not to a large extent employ Profitability Index as an investment appraisal technique.

Table 3.0: Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	130.909			
Final	75.834	55.075	10	.000

Link function: Logit.

Model fitting information: the model fitting information table 5.24 shows whether any of the coefficients are statistically significant. That is whether the variables that were added statistically significantly improve the model compared to the intercept alone. Given that the p-value <.05 (.000), we conclude that the full model statistically significantly predicts the dependent variable better than the intercept-only model alone.

Table 4.0: Goodness-of-Fit

	Chi-Square	Df	Sig.
Pearson	68.697	36	.001
Deviance	48.925	36	.074

Link function: Logit.

Goodness of fit as shown in table 5.25 :is used to assess how well the model fits the data and this is done based on two chi-square statistics – Pearson and Deviance. Note that large chi-square values mean a poor fit for the model. Similarly, statistically significant values mean that the model

does not fit the data well. Therefore, based on the Deviance chi-square p-value >05 (p = .074) there is a good fit between the model and the data.

Parameter estimates: The table of parameter estimates (Table 5.26) is shown below and presents the coefficients of the model and shows that each dummy variable has coefficients for the different techniques.

Table 5.0:Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval		
						Lower Bound	Upper Bound	
Thresho ld	[RISKAN = 1.00]	2.255	.692	10.625	1	.001	.899	3.610
	[RISKAN = 2.00]	4.131	.722	32.692	1	.000	2.715	5.547
	[PB_P=1.00]	.081	1.012	.006	1	.936	-1.902	2.064
	[PB_P=2.00]	.273	.920	.088	1	.027	2.077	1.531
	[PB_P=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
Locatio n	[INTERNA_RR=1.00]	3.350	1.518	4.870	1	.027	.375	6.326
	[INTERNA_RR=2.00]	-2.979	1.420	4.398	1	.036	.195	5.763
	[INTERNA_RR=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[NET_PV=1.00]	-1.304	1.451	.808	1	.369	-4.148	1.540
	[NET_PV=2.00]	-.375	1.289	.085	1	.771	-2.901	2.150
	[NET_PV=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[ACC_RR=1.00]	.862	1.786	.233	1	.629	-2.639	4.363
	[ACC_RR=2.00]	-.852	1.640	.270	1	.603	-4.066	2.362
	[ACC_RR=3.00]	0 <sup>a</sup>	.	.	0	.	.	.
	[PROFI_TI=1.00]	.519	1.404	.137	1	.712	-2.233	3.271
	[PROFI_TI=2.00]	.567	1.429	.157	1	.042	2.234	3.368
[PROFI_TI=3.00]	0 <sup>a</sup>	.	.	0	.	.	.	

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Table 5.26 shows statistically significant results for payback period and profitability index techniques as follows:

PAYBP-2,  $B = .273$ ,  $p\text{-value} = 0.027$  is the dummy variable representing the SOMETIMES USED category of Payback period technique. The positive estimate shows that the manager is likely to ‘sometimes, instead of always, carry out formal risk analysis of investments through the use of appraisal techniques.

PROFITI-2,  $B = .0567$ ,  $p = .042$  is the dummy variable representing the SOMETIMES USED category of profitability index technique. The positive estimate shows that the manager is likely to sometimes, instead of always, carry out formal risk analysis of investments through the use of appraisal techniques.

The foregoing analysis identified two appraisal techniques, viz, payback period and profitability index that are more commonly used by MSMEs but they are used sometimes instead of always.

Objective 2: To identify the dominant factor considered by MSMEs in choosing a particular capital investment technique.

HO2: There is no dominant factor of influence among simplicity, ease of understanding, early recovery of returns, risk and cost in choosing a particular capital investment technique by MSMEs. In testing this hypothesis, we utilized factor analysis (principal component analysis) and the three key outputs – KMO and Bartlett’s test, Total Variance Explained and Component Matrix are shown below.

Table 6.0:KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.876
Bartlett's Test of Sphericity	Approx. Chi-Square	1039.798
	df	10
	Sig.	.000

Shown above is table 5.27 which contains the Kaiser-Meyer-Oklin (KMO) measure of sampling adequacy and Bartlett’s test of sphericity. The KMO statistic varies between 0 and 1 and Kaiser (1974) recommends accepting values greater than 0.5. The table also shows a KMO value of .876 which is acceptable. On the other hand Bartlett’s measure tests the null hypothesis that the original correlation matrix is an identity matrix. Based on Bartlett’s test, the significance value must be less than .05 for the data to be accepted and given the significance value of .000, the sphericity test is good.

Table 7.0:Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %

1	4.304	86.077	86.077	4.304	86.077	86.077
2	.317	6.334	92.411			
3	.166	3.324	95.735			
4	.125	2.507	98.242			
5	.088	1.758	100.000			

Extraction Method: Principal Component Analysis.

Table 5.28 shows the total variance explained and the only factor that explain greater percentage of the total variance and which also has eigenvalue greater than 1.

Table 8.0: Component Matrix

	Component
	1
Importance of simplicity in choosing capital investment technique	.940
Importance of ease of understanding in choosing capital investment technique	.928
Importance of early recovery of investment in choosing capital investment technique	.897
Importance of risk implications in choosing capital investment technique	.948
Importance of cost and time in choosing capital investment technique	.925

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Another important output is the component matrix (Table 5.29) which shows the loading of each variable onto the factor. Based on the component matrix, the component that has been extracted is the importance of risk implications in choosing a particular investment technique. It is therefore obvious that the dominant factor that influences the choice of capital investment technique is the risk implications of a given technique.

Objective 3: To examine the extent to which MSMEs are aware of investment appraisal techniques in Nigeria.

HO 3: MSMEs operators do not to a large extent have high awareness of investment appraisal techniques

This hypothesis was tested with multinomial logistic regression and the outcome of the test is as follows.



**Table 10.0:**Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	30.716 <sup>a</sup>	.000	0	.
AWARE_NESS	56.712	25.996	6	.000

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Based on the p-value of .000 which is <.05 as shown in table 4.41 (model fitting information) the model is suitable.

Table 10.0 (Likelihood Ratio Test) shows that awareness is significant at .000.

**Table 11.0:** Parameter Estimates

Method of decision making <sup>a</sup>	B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
							Lower Bound	Upper Bound
Professional advice	Intercept	.167	.410	.166	1	.683		
	[AWARE_NESS=1.00]	-.013	.495	.001	1	.979	.987	.374 2.606
	[AWARE_NESS=2.00]	-.590	.505	1.365	1	.243	.554	.206 1.491
	[AWARE_NESS=3.00]	1.266	.549	5.319	1	.021	.282	.096 .827
Use of capital appraisal techniques	[AWARE_NESS=4.00]	0 <sup>b</sup>	.	.	0	.	.	.
	Intercept	.310	.397	.610	1	.435		
	[AWARE_NESS=1.00]	-1.003	.532	3.562	1	.059	.367	.129 1.039

[AWARE_NESS=2.00]	2.068	.626	10.908	1	.001	.126	.037	.431
[AWARE_NESS=3.00]	-2.613	.724	13.021	1	.000	.073	.018	.303
[AWARE_NESS=4.00]	0 <sup>b</sup>	.	.	0	.	.	.	.

- a. The reference category is: Experience/skill/intuition.  
 b. This parameter is set to zero because it is redundant.

Parameter estimates: The parameter estimates table (Table 5.45) shows that each dummy variable has coefficients for the different techniques. Though there are three methods of decision making, the ‘experience/intuition’ was used as reference category and so only two logits (i.e logistic regression coefficients) are shown. The professional advice row represents a comparison of the ‘experience/intuition’ method with the ‘professional advice’ method and the second row is a comparison of the ‘appraisal techniques’ method to the ‘experience/intuition method. In the first row, only AWARE\_NESS-3 (Exp(B) = .282, p = .021) which is the dummy variable for medium level of awareness of professional advice relative to experience/intuition is significant given that all other variables are held constant. In the second row, the table shows that AWARE\_NESS-2 which is the dummy variable for LOW AWARENESS of investment appraisal techniques relative to experience/intuition is significant and positive given that all other variables of the model are held constant. Given the foregoing, we reject the null hypothesis that states that the extent of awareness of appraisal techniques on the part of operators of MSMEs is high. In other words, we accept the alternate hypothesis that the extent of awareness of investment appraisal techniques among MSMEs is low.

On the basis of the low level of awareness established in the test of the hypothesis we further sought to determine if there are differences among MSMEs in their level of awareness of appraisal techniques.

Derivative Hypo 3: There is no difference between MSMEs in their level of awareness of appraisal techniques.

This hypothesis was tested with Kruskal-Wallis test on a disaggregated basis and the output is as follows.

Table 12.0: Test Statistics<sup>a,b</sup>

	Level of awareness of the use of payback period	Level of awareness of the use of internal rate of return	Level of awareness of the use of NPV	Level of awareness of the use of accounting rate of return	Level of awareness of the use of profitability index
Chi-Square	12.619	8.398	8.798	8.063	8.137
Df	2	2	2	2	2
Asymp. Sig.	.002	.015	.012	.018	.017

a. Kruskal Wallis Test

b. Grouping Variable: Classification of firms based on asset value

The significant p-values of the Kruskal Wallis table of Statistics (table 5. 46) for each technique clearly show that differences among MSMEs in their levels of awareness of appraisal techniques. The aggregated test (Tables 5.47 and 5.48) equally confirm ( $p = .000$ ) the existence of differences among the operators of MSMEs.

Table 13.0: Ranks

	Classification of firms based on asset value	N	Mean Rank
Level of awareness of appraisal techniques	<N10m	111	88.59
	N10 - N30 m	50	93.63
	>N31m	35	136.90
	Total	196	

Table 13.0: Test Statistics<sup>a,b</sup>

	Level of awareness of appraisal techniques
Chi-Square	21.167
df	2
Asymp. Sig.	.000

a. Kruskal Wallis Test

## 6.0 Discussion of findings

The first objective sought to identify the extent of usage of the following appraisal techniques by MSMEs: payback period, internal rate of return, net present value, accounting rate of return and profitability index. Each of the objectives focused on one of the techniques. The statistical tests clearly confirm that capital appraisal techniques are used, albeit, infrequently by MSMEs. In addition, the groups of firms of medium, small and micro differ in their adoption of the techniques. This partly corroborates the findings of Jifar (2020), Ndanyenbah and Zakaria (2019) and Ayodele (2010) who discovered that operators of SMEs generally use appraisal techniques. However, not all the techniques were used. The infrequent usage of the techniques obviously points to some underlying difficulties or challenges. Operators of MSMEs exercise discretion in their choice and adoption of techniques based on the managers' experience and competence. Expectedly, such techniques as payback period and profitability index featured more than the others. This aspect of the findings equally tallies with the finding of Ayodele (2010) to the effect that the payback period is a popular technique.

The infrequent use of the techniques is traceable to a number of factors which are traceable to both the techniques and the users. On the part of the users, level of education, experience, knowledge of the techniques and change readiness in embracing the rational approach to decision making may enhance or impede the adoption of the techniques. In addition, availability of data, cost considerations and reliability of the techniques are equally pertinent. Given the fact that the survey sample was made up of firms of different sizes, the outcome of the statistical test is possibly a middle ground condition in that there are firms, like the medium sized firms, that use more frequently and those, like the micro firms, that do not use the techniques at all.

The second objective sought to identify the dominant factor, out of several factors, that influence the choice of a given capital investment technique by managers of MSMEs. Based on a factor analysis of five factors, viz, simplicity, ease of understanding, prospect of early recovery of investment, risk and cost, the risk implications of a given investment turned out as the factor that was considered most critical by the managers. Ordinarily, the choice of a technique depends on a number of factors which relate to the manager, the technique or the environment. For instance, while some techniques are simple and easy to understand, some others are sophisticated and often require special expertise. But the risk implications of the investment was considered most crucial by the managers of MSMEs.

Objective three examined the extent to which MSMEs are aware of investment appraisal techniques in Nigeria. It is generally recognized that awareness is a precursor of action. On this basis the study identified the level of awareness of investment appraisal techniques among managers of MSMEs. It was discovered that the extent of awareness is low. This does not align with the finding of Ndanyenbah and Zakaria (2019) who discovered that SME operators had significant knowledge of basic appraisal techniques. This is understandable given the different categories of firms that make up MSMEs. As a matter of fact, Jifar (2020) in his study equally discovered that SME operators had significant knowledge of investment appraisal techniques. This prompted us to carry out a Kruskal-Wallis test which identified that there are differences among managers of MSMEs in the level of awareness of appraisal techniques. In other words,

managers of medium-scale firms perhaps have higher level of awareness than managers of micro businesses.

Policy measures: It is clear from the foregoing that MSMEs exhibit half-hearted adherence to the adoption of appraisal techniques. This points to a lack of conviction to embrace the rational approach to decision making which engenders more effective decisions. In this direction, government's policy thrust should be on how to develop the managerial capacities of operators and owners of MSMEs. In specific terms, the following policy measures would be useful in bringing about the needed re-orientation of operators of MSMEs.

1. Policy measures should give more attention to the development of the managerial competencies and knowledge of owners and managers of MSMEs through the instrumentality of Business Development service providers. Efforts should be geared towards addressing the challenges faced by MSMEs in tackling the tension between rational and non-rational methods of decision making. Government should be able to stimulate the demand for business development services by MSMEs through matching supply with demand, providing incentives and defining the framework and guidelines for such relationships.
2. Government should provide enabling environment for business linkages between big businesses such as MNCs and smaller enterprises. Such linkages which may be based on R & D and resource acquisition provides numerous benefits such as exposure to national and global business best practices. Such exposures are critical to the cultivation of change readiness.
3. TETFUND should consider introducing an intervention for universities to through their faculties of Business or Management Sciences institute regularly business census of micro businesses in their locality and provide free business development services to a given number of them. Such a programme will go a long way in increasing the knowledge base and business outlook of the firms and can be sustained through linking it to the National Universities' Commission's accreditation exercises.

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