Effects of Unsupplied Electricity and Owner Involvement Styles on the Returns of Milling Machines Operations in Ile-Ife, Nigeria

Agbaje, Y. T.
Department of Management & Accounting
Obafemi Awolowo University
Ile-Ife, Nigeria

Abstract

The study investigated the effect of unsupplied electricity and owner involvement styles on the revenue generated by milling machine operators in Ile-Ife, Nigeria. Primary data were sourced from 137 operators through a carefully developed questionnaire. Results indicated that unsupplied electricity significantly affect revenue of milling machine operators (t = 11.63; p = 0.001) with revenue realisable by operators with backups being almost three times the revenue realised by their counterparts without backups. However, the benefit-cost ratio was more favourable for the respondents without backups. It was also concluded that owner management milling businesses were able to record significantly higher returns than manager operated businesses (t = 3.97; p = 0.07), and lastly large sized milling machine businesses significantly recorded higher returns in milling machine operations at (t = 5.09; p = 0.09) compared to smaller sized businesses. Although fuel powered milling machines generated more revenue for owners, its attendant disadvantages in the area of physical energy required to turn the engine on when needed, extra attention and cost of fuelling are not suitable for operators' convenience. Likewise, fuel powered operators had lower benefit-cost ratio relative to electricity powered operators.

***Keywords*:** Unsupplied, Electricity, Unstorable, Backups, Performance, benefit-cost ratio

1.0 Introduction

Growth and development occasioned by technological advancement has led to greater need for electricity in the current day. Infact, it can be said that almost all facilities used in areas of human endeavour have had an incorporation of electrical or electronic components that require the use of power. This has put pressure and necessitated increasing demand for this unstorable resource. Unfortunately, this resource has never been supplied in the right quantity to meet demands in Nigeria. Increase in; population, technological consumption, and industrialization in the face of constant or declining power generation have been responsible for the erratic supply in the country. While there is an active literature on the effects of infrastructure such as electricity on various facets of economic development, there has been relatively little research on how infrastructure affects the behaviour of firms. Since firms are an important engine of growth in the economy and infrastructure is an essential input in firms' production processes, identifying how firms respond to infrastructure is crucial for understanding the micro-foundations of growth in developing economies (World Bank, 2012). While the significance of resources and inputs in returns of any business has been well orchestrated, the importance of human resource cannot be underestimated. While some businesses flourish in the face of definite time estimate such as the productive employment where tangible products are produced and to be sold later, other businesses have their performance depending on the dynamic employee time structure. The concern is therefore on whether employees who are under contract of wage willing to supply a dynamic time structure for the enhancement of their master's businesses

In line with meeting psychological needs of man (food, housing, and clothing) and increasing livelihood objective through productive employment, the demand for power has had great impact on the returns of many small scale businesses among which is milling operations. Milling operations is the use of machines to transform some commodities mostly agricultural outputs in their natural form to a smooth textured form that is needed for further processing. It covers so many areas but this study intends to limit its findings to operations of market people in Ile-Ife, Nigeria.

This category of vendors by way of their locations specialise in milling household consumables/food such as pepper, melon, beans prepared to make into paste for bean cake, dried yam chips and soaked maize grains to be made into semi thick white paste for direct consumption in small quantities that serve immediate need of nuclear family set up. Food intake is a necessity for all human beings and it remains a pivot on which human survival revolves, its quantity and quality characteristics become secondary in any analysis when food is considered a psychological need. Before any food item can be fed into the mouth, it must be broken down into smaller pieces. Some food items must undergo comprehensive breakdown into smooth particles by being grinded (milled) before it can undergo further processing. Milling is a mechanical process through the use of power to propel a set of engine that has provision for allowing objects in between its metallic surface and coming out at the other end in powdery/smooth texture or paste. If an electric power generating unit currently in operation fails or if the demand is unexpectedly very high relative to supply, a power/energy utility business may have no other option but to import expensive power from another source or press into service one of its own inefficient means of generating power. The cost of producing electric power is a random variable because it is dependent upon the uncertain mix of available generators and the uncertain demand. This study therefore attempts to evaluate the trade off between alternative sources of power generation against unsupplied public electricity generation on the revenue base of respondents.

According to World Bank survey of public enterprise (2012), an average firm in Nigeria experienced an outage of 8.2 hours 26.3 times in a typical month. This translates to loss of economic activities for 216 hours (9 days), on average, in every month, assuming no palliative measure. On the basis of this, firms in power insufficient countries have adopted different strategies to cope with this poor electricity supply. Some of these response adjustments include choice of business, choice of location, output reduction, factor substitution and self generation. While most studies considered the influence of unsupplied electricity on the performance of manufacturing firms from such dimensions as; comfort of employees for maximum output, spoilage of inputs and semi finished products, inability to use internet to keep track of current and potential customers in the face of competing market share, and loss of human lives in the medical theatre, this study is different in that focus is being geared towards evaluating the effect of unsupplied electricity on the revenue base of respondents who have made their choice of rendering services through the use of facilities that are dependent on the existence of electricity. In essence, their returns are based on how much of their services are required by customers and how much of these requests are met due to power supplied and unsupplied relations. Even when alternative source of power were used to render the services, its influence on the return base is hereby considered.

2.0 Literature review

Steinbuks & Foster (2010) found that variables such as number of employees, size of a business unit, and export regulation and capacity play more important roles in decision to invest in backup power supply (generator). This is because any interruption in any of the variables could lead to substantial loss that may even threat the existence of the business. According to the work of Bental & Ravid (1982), estimates of costs of power outages show that business incurs more cost to generate its own electricity than the price paid for a kWh of electricity supplied by utilities. However, the study could not find a significant difference between the costs and benefits of own generation, possibly because the study ignored other benefits that can result from self generation. Among the earliest studies to examine the impacts of power failure and its costs on Nigerian manufacturing sector using sample surveyed data were Ukpong (1973), Lee & Anas (1989), and Uchendu (1993). Their results indicated that small firms suffer more from unsupplied electricity than large firms. However, their analyses were principally based on self assessment data (estimates) supplied by firms and their sample scopes were also highly limited. Similarly, Adenikinju (2003) revealed that the cost of electricity failure in Nigeria using investment in backup generator in a sample of 162 firms in three industrial axes of the country is higher for small firms to bear than for big firms. His estimate of cost of outages based on Bental & Ravid (1982)'s methodology showed that the cost of generating a kWh of electricity by a firm was higher than the tariff rate charged by the utility company in the country.

3.0 Methodology

Various approaches have attempted to measure the cost of power outages to businesses (industrial sector) using different methodologies. These methodologies can be generally categorised into two; one estimate was on macro data, and the other estimate emphasised micro analysis of individual plants.

The macro approach benefits from its simplicity and ease of implementation compared to many other methods. Despite the privileges enjoyed by this approach however, its implicit assumption of no substitution between electricity and other factors of production is questionable. Furthermore, such computations only estimate average cost of unnerved energy, whereas the interest should be on the marginal cost, since an electric utility has to decide on additional capacity or marginal cost or worth of reliability; the curtailable risks (or mitigated costs) by customers. Since the amount of loss that consumers are able to curtail through their actions in the event of an outage would definitely have impacts on their willingness to pay for extra reliability from the grid; and the unmitigated costs, because the amount of loss the customers are unable to prevent through their actions would affect their decisions in evaluating how much more reliability is necessary for their businesses. This study relied on estimates from micro analyses of firms through data generated from 137 individual business vendors (96 with backup to manage the unsupplied power and 41 without backup). The justification for preference of micro analysis stems from the ability to minimize errors of computation in that macro analyses has never been able in any study to study all firms and aggregating result. Rather, samples are taken, and generalisation made using a set of statistical assumptions. However, variations are widely applicable between firms in terms of parameters being aggregated. The consequence could be overestimated or under estimated results. The approach used in this study was to estimate the effect of backup through cost-benefit estimates against those who stand to lose as a result of power outage (unsupplied electricity) in supplying their services. Although generators are used to power most machines, the situation is different in milling machine operation. Specific machines are made to use fuel while others are made to use electricity. In this study, the use of two different types of milling machines (electricity powered and fuel powered) will be considered. The underpinning here is that the available substitution to power milling machine in the face of power outage is to subscribe to the purchase of fuel powered alternatives.

4.0 Results and Discussions

All businesses have inherent their attributes which enhance their effectiveness. Some of the variables that were used to proxy attributes in this study are presented in Table 1. The result indicated that the business is mostly female dominated. This can be justified in that almost three quarter (73.73%) of the respondents are female. In terms of income augmentation structure, more than 40% of operators claimed to operate milling machine on part time basis. This is because they have other forms of income generating activities apart from milling businesses. The number of milling outlets is an indication of scale of operation of any business. Majority of the respondents in the milling business (86.86%) operate from only one outlet. This is clearly summarised in Table 1. In terms of source of power to operate the milling machines, approximately 30% of the respondents operated solely electricity powered machines while the remaining 70% had combinations of fuel powered and electricity powered milling machines. Lastly, the study classified respondents on the basis of who manages the business affairs. About one quarter of business outfits were managed by paid manager (manager operated) while three quarter were owner managed. The summary of this statistics is presented in Table 1

Table 1: Attributes of operators in milling business

Attributes	**Subdivision**	**Frequency**	
		Absolute	**Relative (%)**
Gender	Male	36	26.27
	Female	101	73.73
Income type	Part time	55	40.15
	Full time	82	59.85
Number of milling outlets	Single	119	86.86
	Multiple	18	13.14
Classifications by power source	Supplied	41	29.93
	Unsupplied	96	70.07
Management style	Owner operated	102	74.45
	Manager operated	35	25.55

Source: Field survey, 2017

4.1 Analysis of likert scale responses about milling machine operation

This study attempted to measure respondents' attitudes to some topical issues around milling machine operation. This was undertaken with the use of the five-point likert scale construction.

This is because attitudes have been established to affect decision in so many areas business decision making. Various constructs that were posited to be affecting decision making in milling machine operations were analysed below:

The very high mean score, those approaching '5' were those that loaded more on positive scale towards the decision making while the low mean score; those close to '1'are those that indicate poor decision making and they deserve to be carefully evaluated for a successful business management practices. Throughout this paragraph, the following acronyms and their meanings were used; SA = strongly agreed, A = agreed, U = undecided, D = disagree, SD = strongly disagree.

4.1.1 Operational decisions about milling machine operations

Eight statements were posited and analysed under this segment. Four out of the statements were highly loaded on the likert scale proposition while the remaining four statements loaded low. The first statement was that respondents will use fuel powered milling machine even if electricity supply can be guaranteed. The interpretation of this is that all things being equal, respondents will have preference for fuel powered milling machine in the face of constant and regular supply of electricity. A very low average weight (1.43) about this proposition implies that if electricity had not remain insufficient, milling machine operators would have preferred electricity powered machines. The second statement was that fuel powered machines improves returns than electricity powered machines. This statement was supported by more than 90% of respondents (strongly agreed and agreed) categories. This may be because fuel powered machines are available for service delivery anytime customers are available for patronage whereas electricity powered machines are unavailable for service when power becomes unsupplied, even in the face of customer request. This statement loaded as high as 4.37 as indicated in Table 2. The third statement also corroborate the second statement in that it stated that fuel powered milling machines guarantees good spread of returns. This is because the randomness of customer patronage is translated into returns throughout all days. Compared to electricity powered services, instances arise when customers are turn off; a situation in which operators are unable to attend to customers due to power outage.

Next on the list is the statement on time management. This statement was supported by 80% of the respondents. Exact time to operate can be defined. Customers can be given the exact time to come back for their milling services. In the case of electricity powered machines, no vendor in the milling business knows exactly when power will be restored for the services requested to be discharged. This therefore puts 'an arrest' on time management of the vendor by waiting endlessly for power to be restored in order to render the milling services. Next on the list of statements developed in this study was about cost factor in milling business. The statement attempted to compare cost incurred by the use of fuel powered and electricity powered milling machines. The statement loaded very low on the construct scale. This then implies that cost incurred in fuel powered milling machines is higher than it was in the electricity powered milling machines. In terms of management involvement style, response loaded low on the five point likert scale when it was constructed that respondents will recommend the use of manager operated milling machine. The seventh statement is about the ease of operation of milling machines. When the statement was posited that fuel powered milling machines are easier to operate compared to electricity powered milling machines, the mean score loaded very low. This low average score is an indication that fuel powered milling machine is not as easy to operate as electricity powered milling machines. Lastly, it was posited that owner operators in milling business are more sensitive to machine faults than manager operated milling businesses. This construct loaded very high on the likert scale. This is to establish that owners would react to faults more quickly in order to avert the possibility of complex faults that could erode many days of income in the nomenclature of repair. This summary can be seen in Table 2

Table 2: Operational decisions about milling machine operations

Statements	Level of Agreement (%) (n=137)					
	SA	A	U	D	SD	Mean
I will always use fuel powered milling machines even if electricity can be guaranteed	4	1	2	48	45	1.43
Fuel powered milling machines improves my milling business returns than electricity powered machines	31	61	3	4	1	4.37
Fuel powered milling machines guarantees a good spread of my returns	22	59	12	4	3	4.03
Fuel powered milling machines enhances my time management	22	58	12	5	3	3.94
The cost I carry in my milling business is lower for fuel powered machines compared to electricity powered machines	3	12	13	51	21	1.76
I will always recommend the use of manager operated milling machines for any intending operator	3	5	7	53	32	1.44
Fuel powered milling machines are easier to operate relative to electricity powered machines	3	4	15	21	57	1.22
Owner operators in milling business are more sensitive to machine faults relative to manager operated	37	42	12	6	3	4.17

Source: Field Survey, 2017

4.1.2 Problems of self powered milling machines

It was deduced from respondents as summarised in Table 3 that the use of self powered milling machines in the face of power outage leads to a very high cost of operation that could be difficult to transfer to customers. This cost is principally the cost of petrol or diesel as the case may be to power the machines. All respondents, whether they invested self powered machines or not identified this practice as being expensive relative to returns from the investment.

The second most important problem listed by majority of the respondents (91%) as summarised in Table 3 was that the business is difficult to operate with manager due to lack of trust. This lack of trust as indicated by respondents meant that total remittance of proceeds to the owner is low. This means that in addition to amount due as wage, the managers make unearned income in the form of unremitted proceeds. This thereafter has a strong bearing on the true profitability of investment by the actual owner of the business. In the same vein the life span of the investments are affected. Next in the list of problems identified was that most of the petrol and diesel engines are always more difficult to get qualified technical knowhow to service them when the need for such arises. This may mean that such machines may not be enjoyed for the appropriate life span before they turn scrab. This problem was indicated by about 61% of respondents. Once this problem persists, it is very unlikely that such machine will recoup their investment being turned scrab. The major input carried by self powered milling machine operators is the fuel. These products are highly flammable and pose threats and danger to human beings. Respondents indicated on many occasion that neighbours to locations where these products are kept have complained to local authority heads with several warnings being given to them. It was also asserted that when they take these products to distant places like bush and uncompleted structures, the attendant theft by unknown people make them carry more cost than normal. This problem was raised by 53% respondents. Any fuel powered engine for milling purposes requires physical stamina to propel the machine to function. Most people along this trade are women who are either in their middle to old ages. These categories have limited energy to propel all these machines. In addition, it was also stated that the use of fuel powered milling machines generate fumes from the exhaust of the machine which they found as leading to contamination/pollution. The diffusion of the fumes to neighbours has not met with pleasant relationship. Unlike in most other power generating businesses, when alternative power is set up, it can serve some other accompanying purposes such as illumination, charging, and operating any other electronic facilities. This is not possible in the case of milling machine. Its own power is inbuilt; no external source can be supplied with its power. This position was listed by about 30% of the respondents. Lastly on the list of problems was the smell of petrol. This is because intermittently the container for this product will have to be opened to empty into the tank of the machine. In so doing, there is always the attendant smell that may not be pleasant to some people. This summary can be seen as indicated in Table 3.

4.1.2 Advantages of self powered milling machines

Two areas of advantages can be summarised for investment in self powered milling machines as indicated in Table 3. The first is that it allows uninterruption in the relationship between customers and vendors. This is because the decision to come for milling services by a customer is a random variable; no one knows exactly when power would be seized. In the event of sudden power outage customers expect an alternative solution from their vendors by way of using fuel powered engine, otherwise they are disappointed. This thereby compels such customer to travel another round of unplanned distances in order to get solution to their milling requests. Customers have higher propensity to move towards milling operators with alternative milling machines when they are about to embark on a milling service. More than 61% of respondents (milling operators) indicated that provision of backup powered machines assist them in keeping track of customers. This summary is presented in Table 3. Next on the list of advantages is the spread of income throughout the period by operators. This is because there is no opportunity cost attached to income because of power outages. When electricity is unsupplied, self powered engines are set on to do the same work and income is generated. This advantage was also indicated by more than 50% of respondents in the study as presented in Table 3.

Table 3: Identified problems and advantages in self powered milling business

Problems	Frequency	
	Absolute*	Relative (%)
Higher cost of operation	137	100.00
Difficulty in getting trusted attendants to operate	125	91.24
Technical knowhow in maintenance and repair	83	60.58
Danger in keeping petrol	72	52.55
High physical energy requirement to set the machine on	65	47.45
Fumes generated by burning fuel	59	40.07
Power generation cannot serve other purposes	41	29.93
Odour of petrol around the milling machine	32	23.36
Advantages		
Keeps track of customers	84	61.31
Allows better spread of income throughout the week	69	50.36

Source: Field survey, 2017 * = multiple response

4.2 Combinations of machine power and management for milling operations

The erratic nature of electricity power has been well discussed in literature. Most businesses have adopted the strategy of backup in order to guarantee performance. This study attempted to establish the degree of backup and management styles put in place by vendors. Two broad classifications can be deduced from the study on the basis of power utilisation strategy; complete electricity dependent operators and operators with backups. Operators without backups (iii & iv) from Table 3 accounted for 29.93% of respondents. The other category of operators that accounted for 70.07% (operators with backups) were categorised into two (total backups and partial backups). The operators classified with total backups are those who permanently operate fuel powered engines while the partial backups are those operators with different types of machines (electricity utilising machines and fuel utilising machines). These two classifications respectively accounted for 18.25% (i and ii) and 51.83% (v and vi) as shown in Table 4. The study also classified the operations of milling machine enterprise into owner operated and manager operated. Owner operated are those operators that take responsibility of the smooth running of their business in their self custody while manager operated are those operators that have contracted the smooth running of the business into the hands of a paid employee. From this study, approximately one-fourth (ii, iv, and vi) of the operators in this study are manager operated while about three fourth (i, iii, v) are owner operated. This summary can be seen in Table 4.

Table 4: Combinations of machine power and management for milling operations

S/N	Specialization of milling in operation	Frequency	
		Absolute	Relative (%)
i	All self powered engine (owner operated)	17	12.41
ii	All self powered engine (manager operated)	9	5.84
iii	All electricity powered engine (owner operated)	32	23.36
iv	All electricity powered engine (manager operated)	9	6.57
v	Electricity and fuel powered engine (owner operated)	53	38.69
vi	Electricity and fuel powered engine (manager operated)	17	13.14
Total		137	100.00

Source: Field survey, 2017

4.3 Scale of operation in milling machine business

All businesses in all areas of human endeavour have different scales of operations (small, medium, large). These scales have attributable to them different advantages (economies of scale, market share). The number of milling machines owned by an operator and whether an operator has other source(s) of income was proxied as a measure of scale of operation in this study. Any operator with more than two machines was taken to be operating medium size business in this milling operation whether or not other sources of income are available. Again, the number of outlets where milling operations are carried out by an operator is also a measure of scale of operation. On this note, this study asserts that 30.65% of milling machine operations was medium scale in nature. The remaining 69.35% operators are the category of operators that use milling services to augment income from other sources.

Table 5: Number of milling machines owned by respondents

Operator characteristics			**Frequency**	
Total no of machines	**No of milling locations**	**Other lines of business**	**Absolute**	**Relative (%)**
1	1	Yes	53	38.69
2	1	Yes	42	30.66
3	1	Yes	24	17.52
4	2	No	11	8.02
Greater than 4	3	Yes	7	5.11
Total			137	100.00

Source: Field survey, 2017

4.4 Cost structure in milling machine operations (weekly basis)

The cost structure in milling machine operation is hereby analysed under this section. This study compares cost of supplied electricity distribution against unsupplied electricity. Supplied electricity cost refers to tariff paid per Kwh for the state provided electricity. From this study, the 41 respondents who operate electricity powered milling machines limited their operations to those periods when there is the state supplied power. With the recent introduction of prepaid metering system in electricity consumption in Nigeria. Those who have adopted this system prorated their bill onto the various consumption points to evaluate the cost for the use of milling machines. For the categories that do not have prepaid metering system installed, the direct billing charge was also prorated by the number of consuming units. This computation was applicable for the two templates of this analysis. This was because the unsupplied categories do not outrightly do away with supplied electricity. The difference was just that they have backups to mediate the power outage periods. From the study, respondents who depended solely on state electricity (supplied) incurred ₦1,035.11 while their counterparts (partial unsupplied & total unsupplied) incurred ₦5,290.89. This statistics can be seen in Table 6

Table 6: Cost structure in milling machine operation (weekly basis)

Cost range (‘000₦)	Frequency (Unsupplied category)				Frequency (Supplied category)	
	Fuel		Electricity			
	Absolute	Relative (%)	Absolute	Relative (%)	Absolute	Relative (%)
0.5-1.0	13	13.53	47	48.96	36	87.80
1.0-1.5	19	19.79	19	19.79	5	12.20
1.5-2.0	17	17.71	17	17.71	-	-
≥ 2.0	47	48.96	13	13.53	-	-
Total	96	100.00	96	100.00	41	100.00
Sub mean	₦3,998.30		₦1,292.59		₦1,035.11	
Grand mean =	₦5,290.89				₦1,035.11	

Source: Field survey, 2017

4.5 Revenue structure in milling machine operations (weekly basis)

Revenue is the proceed from any economic activity that could be for exchange of physical good or services rendered. With respect to this study, activities in milling business are classified as services. Table 7 summarises the revenue realised by the various operators in the milling activities. This was done by collating revenue realised from self powered machines against supplied electricity. The understanding here was that though they were classed unsupplied operators, their operation was a mixture of self generated power and state generated power. A careful assessment of the summary presented in Table 6 revealed that revenue realised through electricity powered segment of backup respondents was on the average higher by about 34% relative to what was realised from the category without any backup. This difference may be attributable to scale of operation. While the category that depended on backup had more investment into the milling machine operations by way of self powered (fuel consuming) machines, they are also the category with more machines in each of the fuel consuming and electricity consuming sections respectively. This has however translated to a kind of economies of scale. In addition to revenue realised from the respondents that backup their business from electricity consumption was the second source of revenue from the self supplied power. This was almost double the revenue realised from electricity supplied unit by the same category of operators. Although revenue realised by investments in this units went with its attendant higher costs as illustrated in Table 7

Table 7: Revenue structure in milling machine operation (weekly basis)

Revenue range ('000₦)	Frequency (Unsupplied category)				Frequency (Supplied category) Electricity tariff	
	Fuel		Electricity tariff			
	Absolute	Relative (%)	Absolute	Relative (%)	Absolute	Relative (%)
1.5-3.0	9	9.38	61	63.54	23	56.10
3.0-4.5	12	12.50	12	12.50	14	34.15
4.5-6.0	22	22.91	15	15.63	4	9.75
≥ 6.0	53	55.21	8	8.33	-	-
Total	96	100.00	96	100.00	41	100.00
Sub mean =	₦8,035.90		₦4,985.30		₦3,725.47	
Gross mean =	₦13,021.20				₦3,725.47	

Source: Field survey, 2017

4.6 Benefit-cost analysis in milling machine business

This computation was considered to see the returns realised per naira expenditure on power consumed, and the summary is presented in Table 8. While the return in monetary measurement for the respondents that depended solely on electricity was ₦3.60 for every ₦1.00 expended on energy, the value was ₦3.87 for every ₦1.00 tariff paid for electricity by the category that have backup investment in self generated energy. Additional income from the self generated category was with a lower benefit-cost ratio of ₦2.01 for every ₦1.00 investment in fuel to power the machines.

In overall, the performances in the milling operations can be summarised into; ₦2.46 for every ₦1.00 tariff (fuel and tariff billing), and ₦3.60 for every ₦1.00 expended on tariff for public provision of electricity. A further breakdown of cost and benefit relations in this enterprise into owner operated and manager operated components revealed that returns were higher for all the breakdowns in owner operated businesses compared to manager operated counterparts. Backup cost which is the bane of this study was also found to be on the high side for the manager operated businesses by approximately 30% compared to owner operated businesses.

Table 8: Benefit-Cost ratio between electricity consumption and management styles

Category of respondents		Cost (₦)	Benefit (₦)		Ratio
Unsupplied electricity operators	Backup cost	3,998.30	8,035.90	2.01	2.46
	State cost	1,292.59	4,985.30	3.87	
Supplied electricity operators		1,035.11	3,725.47		3.60
Owner operated (Unsupplied electricity)	Backup cost	3,750.32	9,502.65	2.53	3.00
	State cost	1,285.15	5,595.22	4.35	
Supplied electricity operators		1,105.80	3,695.32		3.34
Manager operated (Unsupplied electricity)	Backup cost	4,855.29	6,825.55	1.41	1.81
	State cost	1,057.15	3,883.61	3.67	
Supplied electricity operators		1,043.38	2,533.50		2.43

Source: Field survey, 2017

4.7 Statistical comparison of revenues from various avenues

This section established whether incurring huge cost from self supplied power against the opportunity cost of unsupplied power translates to a corresponding effect on revenue generation in milling business and whether manager operated and owner operated strategies had any significant influence on revenue generation within the study area. The result showed that owner operated businesses in the milling business realised significantly higher than their counterpart that were manager operated. One of the reasons that could be adduced for an increase in revenue by owner operated businesses is the sincerity with which business will be consummated between customers and business operation. From a different context, it may also be concluded that manager operated businesses may not remit total returns to the owners of the businesses as ethical requirement warrants. The revenues realised by operators that have backup engines and those without investments in backup engines were also compared. This statistics are clearly indicated in Table 9. The essence was to evaluate the impact of backups due to unsupplied electricity on income generation. The result indicated that there was a significant difference between the two categories of operators. This is not unexpected in that operations in the backup businesses have no opportunity cost value. Once customers in their random fashion approach the operators for services, there is a chance of returns for the business.

The analyses also classified operators into small size and medium size respectively. The result from such classification also pointed that income realised by medium scale operators was significantly higher than income realised by small scale operators.

Table 9: t-test comparison of revenue between some paired variables

Comparison	Means (₦)	t-values
Owner operated	18,793.19	3.97
Manager operated	13,242.66	
Unsupplied electricity operation	13.021.20	11.63
Supplied electricity operation	3,725.47	
Medium operators	17,310.00	5.09
Small operators	6,532.45	

Source: Field survey, 2017

5.0 Conclusion

Milling operation is one of the every moment services that are demanded by people. Its execution to satisfy customers request is dependent on the constant supply of electricity. Because electricity being a state resource is very irregular in most African countries, Nigeria inclusive necessitates why most businesses have resorted to supplying power in order to get their business going. This study evaluated the impact of backups on the activities of milling machine operators in the study area, as well as the influence of management style on the performances of this business. The result indicated that more income (₦13,021.20) trickled down to operators that had backup for their milling services compared to operators without backups (₦3,725.47). However, businesses with backups had a low benefit-cost ratio than businesses that had no backups for their operation. The result also indicated that owner operated businesses outperform manager operated businesses by approximately 42%, and size does matter in revenue generation in milling machine operations. This is manifested in almost three times income generation by medium scale operators relative to small size operators.

Recommendations

Owing to the findings from this study, a number of recommendations are posited which can enhance returns realised in milling machine operations.

i. Each operator in milling machine business should have a combination of fuel powered milling machines and electricity powered milling machines
ii. Owner managed style is recommended so as to guarantee the real return
iii. Operators are advised to enhance their scale of operation as it leads to economies of operation
iv. Government is advised to invest heavily in electricity generation because it remains the major thrust of economic drivers

References

Adenikinju, A. F. (2003). Electric infrastructure failures in Nigeria: a survey-based analysis of the costs and adjustment responses. *Energy Policy*, *31*(14), 1519-1530. doi:10.1016/S0301-4215(02)00208-2

Bental, B., & Ravid, S. A. (1982). A simple method for evaluating the marginal cost of unsupplied electricity. *The Bell Journal of Economics*, *13*(1), 249-253.

Lee, K. S. and Anas, A. (1989). Manufacturers ' Responses to Infrastructure Deficiencies in Nigeria Private Alternatives and Policy Options. *Infrastructure and Urban Development Department, The World Bank, WPS 325*.

Steinbuks, J., & Foster, V. (2010). When do firms generate? Evidence on in-house electricity supply in Africa. *Energy Economics*, *32*(3), 505-514. Elsevier B.V. doi:10.1016/j.eneco.2009.10.012

Uchendu, O.A. (1993). The economic cost of electricity outages: Evidence from a sample study of industrial and commercial firms in the Lagos area of Nigeria. *CBN Economic and Financial Review, 31(3), 34-36.*

Ukpong, I.I. (1973). The economic consequences of electric power failures. The Nigerian *Journal of Economic and Social Studies, 15(1): 53–74.*

World Bank. (2012). \World Bank Group Infrastructure Commitment." World Bank. http://go.worldbank.org/Z2USXGBEM0)