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The Impact of Power Outage "Dumsor" on the Hotel Industry: Evidence from Ghana

Nana Ama Boansi Boakye[1] Frank B. K. Twenefour[2] Mary McArthur-Floyd[1]
1.Department of Hospitality Management, Takoradi Polytechnic, Takoradi, Ghana
2.Department of Mathematics and Statistics, Takoradi Polytechnic, Takoradi, Ghana

Abstract
Ghana has for several years been experiencing massive power blackouts popularly nicknamed 'Dumsor,' which means on and off in the Akan dialect. The role of electricity in Ghana's economy is prodigiously significant for growth and development. The purpose of the study was to explore the impact of power outage ('Dumsor') on the hotel industry in Ghana. The study adopted an explanatory research design covering a stratified sample of 100 drawn from 5, 4, 3 and 2 stars hotels across major cities in Ghana. A set of structured questionnaires was used to collect data and analyzed through descriptive and inferential statistics. The validity/reliability test indicates that the questions were 89% reliable to be used for explanatory analysis of the study and achieved a response rate of 93%. There was a general outcry of unreliable power supply as majority of the respondents indicated the hotels experienced lights out intermittently and unannounced within a week for not less than 12 hours per day which has led to low productivity (86%). Also 92% of the respondents indicated that the effect of 'dumsor' has led to high production cost, high rate of redundancy of employees, an increase in maintenance cost, damage to plant/equipments/appliance and perishability of items. The five independent variables accounted for 90% of variations as a result of the power outages and were thus critical to the smooth operations of the hotel industry in Ghana. The study also revealed that an increase in power outages by one unit will increase and worsen the situation (redundancy, perishability of items, and cost of alternative power supply, damage to plant/equipment/appliances and maintenance cost) by 0.401, 0.228, 0.426, 0.218 and 0.316 respectively. To improve on this menace energy crisis, the government and stakeholders should put mechanisms in place to avert this energy canker. Government should have the political will and put incentives in the area of power generation to make it workable.
Keywords: Hotel industry, power outage ('Dumsor'), power supply, explanatory research design and regression coefficients.

1 Background

In the utilities industry, where fully or sufficiently competitive environments are not achieved, the general public's interests are at risk, either through price exploitation, or through the degradation of quality of supply and customer services" (Chau, 2009). A report by UNIDO (2009) revealed that, in spite of the abundant resources Africa is endowed with, it still struggles with supply challenges in electricity. According to the UNIDO (2009) finding, only 26% of households have electricity making Africa the lowest in electricity penetration in all the continents. UNIDO (2009) reported that, an estimate of 547 million people in Africa lack access to electricity. The reliability of the electricity supply is concern faced by every country in the world but in ideal world electricity would be a constant, never faltering supply.

Electricity outages (Dumsor) as describe the Akan local dialect do not just cause economic costs on the business community. Amin, (2003), states that the strain is now beginning to show on today's electricity grid. A large number of electricity interruptions occur every year throughout the world. There is the cost of business closing down because of the electrical power outage. Slavik, (2004), quoted that in the United States "Gartner estimates that two out of five enterprises that experience a disaster will go out of business within five years". Gnmt, (2006), states on their website that 80% of businesses affected by a major incident close within 18 months and 90% of businesses that lose data from a disaster are forced to shut within two years.

In Ghana, electricity as an essential service enjoys protection from competition and consumers really have little or no choice (Chau, 2009; Watson et al., 2002). In other words electricity is the main driver for industrial development. Ghana has for several years been experiencing massive power blackouts popularly nicknamed 'dumsor,' which means on and off in one of the local dialects. The role of electricity in Ghana's economy is prodigiously significant for growth and development (Doe and Asamoah, 2014). Although intermittent power is common in most developing African countries, the energy situation in Ghana is already spiraling out of control. Thousands of industries in Ghana use hydro-electric power for production, storage and distribution and electricity serves as raw material for most small businesses (Doe and Asamoah, 2014; Watson, Viney and Schomaker, 2002).

Hospitality industry has grown tremendously over the years and employs over 47,000 Ghanaians which is almost 9% of the entire working Ghanaian population. The hospitality industry has faced considerable recent adversity due to human and natural forces that have disrupted vital inputs to the service delivery system, notably,

electrical power (Kwortnik, 2005). Ghana has been experiencing power outages for the last three years, making them the longest the country has experienced. The hotel industry has become a significant segment of the general hospitality industry and is undergoing expeditious expansions. According to ECG, (2014), to provide quality, reliable and safe electricity services to support the economic growth and development of Ghana are their mandate. The study on the impact of power outage "dumsor" on hospitality industry is very crucial to inform government for quickest solution to the challenge.

1.1 Research Problem

Africa in general and Ghana in particular, there are problems with the quantum of electricity supplied. The electricity interruptions or fluctuations have had varying effects on businesses including but not limited to instantaneous damage to semi-finished goods, associated costs incurred in repairing equipment's and losses accrued from delayed or cancelled orders (Doe and Asamoah, 2014). Some areas lack electricity for hours on end; others receive multiple power cuts (about five times) each day. Sometimes, the blackouts last for extended periods, some lasting longer than 24 hours. The consequences of the power outages are vast. Business owners are no longer attaining the production levels they desire, their profits have dwindled and thousands of people have lost their jobs as the Centre for Policy Analysis (CEPA, 2007) identified that the In 2007 power rationing exercise in Ghana resulted in increased local manufacturing costs. Hospitality business today is an integral part of the human life whether in a commercial scale or in small scale. The costs of power outages to a firm (in this case hospitality industry) can be estimated using backup generators. The study above suggests that there is an increase in marginal cost over marginal profit at the expense of acquiring backup power supply. However, the motive of every business is to minimize cost and maximize profit, therefore, acquiring backup power supply will increase production cost. This has resulted in sacking employees working in the hospitality industry to reduce production cost and to some extent some industries in the hospitality sector shut down. The study therefore sought to explore the impact of power outage "Dumsor" on the hotel industry in Ghana.

1.2 Purpose of the study

The study sought to explore the impact of power outage "Dumsor" on the hospitality industry in Ghana. To achieve this, the following objectives will be pursued: to investigate the electricity and power supply on the hospitality industry; to explore the alternative ways of power supply; to analyze the effect of power outage "Dumsor" on the hospitality industry and to evaluate the best cost efficient alternative source of power on the hospitality industry.

2 Literature Review

This section presents related literature on electricity and power supply on the hospitality industry, alternative ways of power supply and effect of power outage on the hospitality industry.

2.1 Electricity and Power Supply on the Hospitality Industry

Hospitality business today is an integral part of the human life whether in a commercial scale or in small scale. Hospitality is one of the most interesting and challenging industries to work in and offers a wide range of job and career opportunities and an endless variety of places to work in. Hospitality should be a "place", where people can still be exceptional individuals and they can extend their own personality and style (Hogan, 2008) and it should also mean profitably providing value at any price level, while demonstrating your own unique points of distinction. Hospitality industry is very broad that it includes; hotels, restaurants, tourism, hospital, pub, etc. the study will review the overview of the industry specifically hotel. However, there is a symbiotic relationship between electricity and business (Doe and Asamoah, 2014). Energy supplies have a significant impact on economic activities (Velasquez and Pichler, 2010). This is because it is used for varied purposes ranging from production, storage, powering of office equipment and product display (Doe and Asamoah, 2014). Consequently, the use of electricity serves as input for production. This makes electricity an essential commodity for all industry types- manufacturing, service and distribution. Various sectors of the economy such as manufacturing and transport use enormous amounts of electricity (Haanes et al., 2011) for operation processes including storage, production. It is a critical resource needed to make products. In this respect, electricity as a "transformed unity" serves as a commodity (Doe and Asamoah, 2014).

In a report by UNIDO (2009), it was revealed that, in spite of the abundant resources Africa is endowed with, it still struggles with supply challenges in electricity. In Ghana, electricity as an essential service enjoys protection from competition and consumers really have little or no choice (Chau, 2009; Watson et al., 2002). The hospitality industry employs little over 47,000 employees approximately 9% of the total employment force in Ghana. Various sectors of the economy such as manufacturing and transport use enormous amounts of electricity (Haanes et al., 2011) for operation processes including storage, production. In the last four years Ghana has experience power outage "dumsor" and this is not different in the hospitality industry. The Daily Graphic, one of

Ghana's leading newspapers, reports that Ghana's middle income economic status will require about 5,000 Mega Watts (MW) of electricity to sustain itself (Daily Graphic, 2009). This underpins the Government's goal of increasing installed power generation capacity from about 2,000 MW to 5,000 MW by 2015 and subsequently becoming a net exporter of power (Ministry of Energy, 2010). Expanding electricity generation capacity to the 2015 target would facilitate the Government's aim of achieving universal access to electricity by 2020 from the current level of 66% (Ministry of Energy, 2010). However, without augmented investments in the power sector, total electricity generation capacity will be only about 2,665 MW by 2015, leaving a deficit of about 46.7%. The challenge is how to attract investments to build the necessary infrastructure for the generation, transmission and distribution of electricity throughout the country (Ministry of Energy, 2010).

2.2 Alternatives ways of Power Supply

The power supply in developing countries especially Ghana has be weird over the last years. Companies and staff lose their jobs due this unfortunate. The Daily Graphic, one of Ghana's leading newspapers, reports that Ghana's middle income economic status will require about 5,000 Mega Watts (MW) of electricity to sustain itself (Daily Graphic, 2009). Complementary power generated from thermal plants with the intent of augmenting electricity supply in Ghana has not provided an antidote to the inadequate and unreliable supplies of electricity (ISSER, 2005). Ghana supply power through thermal and hydro. However, the dumsor has compelled most companies to acquire alternative power supply whenever there is power outage. There are many ways to sustain electricity in companies, especially the hotel industry but the cost is unimaginable. The possible alternative power supply include generators, plants and or solar. This literature will review the necessary power supply hotel industry can acquire at the expense of dumsor. (Daily Graphic, 2009) Complementary power generated from thermal plants with the intent of augmenting electricity supply in Ghana has not provided an antidote to the inadequate and unreliable supplies of electricity (ISSER, 2005). ISSER (2005) and Kumasi Metropolitan Assembly (KMA, 2006) assert that increasing population with corresponding inelastic supply of electricity are the major factors affecting the reliable supply of electricity for industrialization in Ghana. Compounding the problem is the inability of the Electricity Company of Ghana (ECG) to replace old transformers and loaders with new ones of higher capacities.

This is blamed on unrealistic electricity tariffs (ESMAP, 2006). Electricity feeders and transformers have consequently been overloaded causing frequent and unannounced blackouts in Ghana. Due to this, industries ranked interrupted power supply highest among 13 other problems (NDPC, 2008; Association of Ghana Industries (AGI), 2009). It has been identified that the affected enterprises experience poor service quality which destroys machinery and goods and thus increase their production cost. The frequent and unannounced blackouts are not unique to Ghana as the Confederation of Tanzanian Industries (CTI) argues that Tanzania's manufacturing sector also experiences unreliable, intermittent power supply, frequent rationing and outages (CTI, 2011). The unreliable power supply causes manufacturers to experience throughout the year poor service quality, unplanned power stoppages and interruptions, voltage fluctuations, phase failures and unbalanced voltages (CTI, 2011). Gyau-Boakye and Tumbulto (2001) identified that climate change has reduced the volumes of the Volta Lakes' tributaries by more than 20%. Their comparisons of runoffs for two time periods show reductions in mean stream flows of 32.5% at Saboba on the River Oti and 23.1% at Nawuni on the White Volta (Gyau-Boakye & Tumbulto, 2000). Niasse (2005) also adds that West Africa's major rivers (Niger, Senegal and Volta) have experienced concomitant decrease in average discharge of between 40 to 60%.

2.3 Effect of Power Outage on the Hospitality Industry

Energy supplies have a significant impact on economic activities (Velasquez and Pichler, 2010). Similarly, (Corwin & Miles, 1977) stated that the economic cost of the 1977 New York City's blackout which lasted for about 25 hours was huge. Impact included; loss of production time, damage to plant equipment, destruction of product, and additional maintenance costs. That is there is huge sum of additional cost whenever the power is off for hours and to some extent days. Individuals invest their resources in a business and recoup their profit in the near future. However, power outage settles in and production is cut down hence affect the return of assets invested. Ofosu-Ahenkorah (2008) argues that one of the vital factors for the sustenance of Ghana's middle-income status is the supply of reliable electricity to the MSI subsector. The effect of power outage "dumsor" does not only affect the owners of the company but travel far through the staffs and down to the final consumer.

The economic effects of power outages on firms' activities have been analyzed in many studies (Lee and Anas, 1992; Steel and Webster, 1991; Adenikinju, 2005; Uchendu, 1993; Beenstock et al., 1997; Bernstein and Heaney, 1988; Caves et al. 1992; and Matsukawa and Fuji 1994). Most of these papers estimate the costs of power outages through either a subjective approach (self-assessment of lost production), or an objective approach (in which electricity intervenes directly as an argument in a production function). These various approaches, coupled with the specificities of countries under study, have translated into a wide range of estimates, which make it difficult to generalize the findings. Further, it seems that little attention has been

devoted to the effect of power outages on productivity. The Centre for Policy Analysis (CEPA, 2007) identified that the 2007 power rationing exercise in Ghana resulted in increased local manufacturing costs. Velasquez and Pichler (2010) also reiterated that sufficient and affordable supply of energy (in this case, electricity) has had a decisive significance for economic activities and economic growth can or may be restricted by resource energy. Since a country's economic growth is a composite of economic activities of small and medium enterprises, the less cost they have to tolerate, the better a country's chance at harnessing their input towards greater levels of gross domestic product and growth. Okpara (2011) consents that; the hospitality can contribute immensely towards economic growth and poverty reduction.

Another effect of power fluctuations on the hospitality industry is related to their level of competitiveness. Arinaitwe (2006) has revealed from his research that the rate at which the hospitality industry fails in developing countries is higher than in the developed world. Irjayanti and Azis (2012) in their research found that as a result of the free market system, Indonesians were fighting stiff competition from foreign products and firms who have the ability to produce better quality products. In their research, they found that high cost of energy accounted for 62% of respondents' identification of barrier factors against Indonesia industry. Workers relying on electricity had to reduce work hours by an average of 8% per day during the blackout period (Burlando, 2010). The August 14, 2003 blackout that occurred in New York, Michigan, Massachusetts, Ohio, New Jersey, Connecticut and Vermont all in the United States of America, caused an estimated loss of $6.4 billion (Anderson &Geckil, 2003).

In another study conducted in Indonesia, it was revealed that among the many barriers to the hospitality industry development supply and price of reliable electricity was mentioned by 62% of the 180 respondents as being a major barrier to the hospitality industry development (Tambunan, 2009). In the same research report, high production capacity deficiency, limitation in sales and high labour costs accounted for 21%, 36% and 18% respectively. In a another study in Indonesia, it was found that the hospitality industry sector account for 99% of businesses in Indonesia making them the most significant contributor to Indonesia's economic development (Irjayanti, Maya and Azis, Anton Mulyono, 2013). Other studies by Wang (2002) on outage costs and strategy analysis of the hi-tech industries revealed that production process spans weeks and sometimes months in planning and execution. A slight variation in the load of supply can therefore render the objects they produce obsolete. Wang (2002) further revealed that a power interruption lasting between 1 and 4 seconds can result in a loss of more than US$ 3 to 10 million of damage to their properties.

3.0 Research Methodology

The study adopted explanatory research design. The design allowed detailed description and analysis of the variables under study; describing and presenting their attributes and explaining their relationships without manipulations as supported by Saunders et al (2009). The study covered a stratified sample of 100 drawn from selected 2, 3, 4, and 5 stars hotels across major cities in Ghana. A structured, self-administered questionnaire was used to collect data. Before administration, the questionnaire was pilot-tested and subjected to reliability test using Cronbach Alpha; resulting in a reliability coefficient of 0.892 which was above the recommended minimum of 0.7 (Santos & Reynolds, 1999). Data collected was analyzed using statistical package for service solution (SPSS) version 22 for both descriptive and inferential statistics. Descriptive statistics such as frequency and percentages were used to explain the attributes of the respondents whereas inferential statistics (analysis of variance and regression coefficient) were used to established the model and to determine the extent to which the model explained the relationships of the variable and their significance difference with respect to the variable (dependent and independent variables) characteristics (Twenefour et al., 2015).

4.0 Results and Discussions

A reliability test using Cronbach Alpha; resulting in a reliability coefficient of 0.892 which is above the recommended minimum of 0.7 (Santos & Reynolds, 1999) was conducted on all 22 variables used in the study (see Table 1).

Table 1: Reliability Statistics

N	%	Cronbach's Alpha	Number of Items
100	100	0.892	22

It can be inferred from Table 1 that variables assigned for the study were about 97% reliable to be used for explanatory analysis of the study. The study achieved a response rate of 89%, Findings on Table 1 shows that the study was dominated by females. Out of the 100 respondents, 64% were females whereas 36% were males. Most (74%) of the respondents were in the age range of 18-39 years. A little over a quarter of them (about 26%) were either 40 years or above 40 years. The level of the respondents' education was mostly between tertiary and the second cycle (that is, the senior high school). It was discovered that a little more than half (about 51%) of the respondents graduated from tertiary school whilst over one-third (39%) of the respondents were graduates from

secondary schools, whiles a few (10%) of them reported that they had only been educated up to the Junior High School level. Table 1 further indicates that the respondents majority of the respondents (48%) were single followed by married (35%).

As part of assessing the characteristics of the respondents, the study sought to find out the distribution of the respondents by departments. Respondents were chosen from the Kitchen, Front Office, Marketing and the Accommodation departments. Most of the respondents reported that they were from the Kitchen (43%) and the Front Office (20%) departments. Also, over one-third of the respondents indicated that they were from the Marketing (19%) and Accommodation (18%) departments respectively. The number of years that the respondents had spent working in their respective hotels was assessed. It was observed that 49% of the respondents had worked with the hotels for 2-5 years. Those who had worked with the hotels for less than 2 years were 29% out of the total respondents. Also, 22% of the respondents indicated they have worked with their respective hotels for more than 5 years.

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Table 1: Demographic Characteristics of Respondents

Response	N	Frequency	Percent
Gender	100		
Male		36	36.0
Female		64	64.0
Age group (years)	100		
18 – 29		36	36.0
30 – 39		38	38.0
40 and above		26	26.0
Educational Background	100		
JHS		10	10.0
SHS		39	39.0
Tertiary		51	51.0
Marital Status	100		
Single		48	48.0
Married		35	35.0
Divorced		7	7.0
Separated		10	10.0

In relation to the above questions; 47% of the respondents reported that the hotels rarely received electricity power A little over a quarter of them (28%) reported that the hotels were only receiving electricity once in a while. On the contrary, about 26% the respondents reported that the hotels were receiving electricity power very often. This finding agrees with Velasquez and Pichler (2010) that a detriment to the operations of the hotels as the supply of electricity energy is very significant in the provision of economic activities.

The Duration of Electricity Power Supply to the Hotel

In relation to the duration of power supply to the hotel, 48% of the respondents reported that the hotels were receiving electricity power for about 12 hours whilst about 44% of them reported that the electricity power the hotels received had lasted for about 8 hours. A few (about 8%) of the respondents reported that the electricity power that the hotels received lasted for about a day (24 hours). This gives the indication that the supply of electricity by the producing companies to its consumers is facing a lot of challenges as was revealed in a report by UNIDO (2009) that in spite of the abundant resources Africa is endowed with the continent still struggles to supply electricity to its people due to various challenges.

Frequency of "Dumsor" Occurrence

Furthermore, having looked at how frequent the electricity power is given to the hotels the study sought to find out how frequent the hotels have been experiencing "light out". In view of this, the respondents were asked to acknowledge how frequent "dumsor" occurred at their end and the result of their analysis is presented. It was observed that 41% of the respondents involved in the study reported that the hotels experienced lights out three (3) times within a week for not less than 5 hours. About one-third (33%) of the respondents reported that the hotels experienced "dumsor" daily whilst a little over a quarter (25.76%) of them reported the hotels experienced lights out on five (5) out of the seven (7) days in the week. This indicates that the hotels were experiencing electricity power outages at least three times in a week which is very detrimental to production process of the hotels as electricity power outage for some time can render a food process poisonous. This finding supports that of Wang (2002) who revealed that production process spans weeks and sometimes months in planning and execution and so a slight variation on the load of supply can therefore render the objects they produce obsolete. Wang (2002) further revealed that a power interruption lasting between 1 and 4 seconds can result in a loss of more than US$ 3 to 10 million of damage to their properties.

Challenges Faced by Hospitality as a Result of Power Outages

The on-set of the power outages brought a lot of displeasing outcomes to many businesses in diverse ways. In view of this, the study sought to find out the consequences that the power outages brought to the hospitality industry. Findings from Table 2 show some of the challenges faced by the hospitality industry as a result of the power outages in the Metropolis. 36% of the respondents said most of their workers were laid-off or their appointments were terminated (redundancy) from business, 30% said profit dwindled, hot temperature in the working area and workers unable to meet their target accounted for 20% and 14% in turn. Our cities today live on electricity and without reliable power supply from the power grid; pandemonium will certainly break loose, especially in metropolitan, district and municipal towns in Ghana.

Table 2: Challenges Faced by the Hospitality Industry as a Result of Power Outages

Challenges	Frequency	Percent
Most workers were laid-off as production decreased	36	36.0
Hot temperature in the working area	20	20.0
Workers unable to meet their targets	14	14.0
Profit dwindled	30	30.0
Total	100	100

Alternative Power Supply at the Hotel

Regarding alternative power supply available to the hotel, most hotels emphasized that they solely rely on generator, plant and solar as their alternative source of power. 44% of the respondents responded that their hotels use generator as an alternative power supply in their hotels when there is "dumsor". Those who responded that the hotels use plant as their alternative power supply were about 42% of the total. Also, about 14% of the respondents reported that the hotels used solar as their alternative power supply.

The hotels' reliance on alternative power supply shows that the supply of electricity in the country is not reliable as ISSER (2005) noted that the complementary power that is generated from thermal plants with the intent of augmenting electricity supply in Ghana has not provided an antidote to the inadequate and unreliable supplies of electricity.

Table 3: The Alternative Power Supply Available at the Hotel

Alternative power supply	What happens to power supply if there is "dumsor" on the hotel ?	
	There is an alternative (Yes)	
	Count	Percent
Solar	13	13.7
Generator	42	44.2
Plant	40	42.1
Total	95	100.0

Impact of Electricity Supply on Hotel Business

The study also assessed the impact of electricity the impact of electricity outage on hotel business. According to the results (Table 4) of the study, respondents were skewed towards 'yes' with respect to the statement: low

productivity (86%). This implies that the respondents acknowledged that electricity has an impact on the activities of hotel businesses as Velasquez and Pichler (2010) indicated that energy supplies have a significant impact on economic activities because the electric energy is used for varied purposes ranging from production, storage, powering of office equipment and product display.

Also 92% out of the total respondents were of the view that power outage results in high production cost to the hospitality industry in the metropolis. Doe and Asamoah (2014) indicated in their reports that there is a mutual-benefit relationship between the provision of electricity and the operation of businesses. Businesses rely on electricity for their operations whilst the electricity producing companies in turn rely on businesses as major consumers of their products..

Table 4: Impact of Power Outage on Hotel Business

Response	Impact				Total	
	Low productivity		High production cost			
	Count	Percent	Count	Percent	Count	Percent
Yes	30	86.0	62	95.0	92	92.0
Somehow	5	14.0	3	5.0	8	8.0
Total	35	70.0	65	30.0	100	100.0

This is because operators of small and medium scale enterprises (SMEs) depend highly on electricity as a standardized input without which they cannot produce to satisfy their customers. The power outages do not only influence the workers of the hotel but do bring discomforts to the hotel as whole by adding some form of cost to the hotels' overhead expenses. The respondents were asked if there were additional costs that were incurred due to power outages. Table 5 presents a multiple response on the perceived additional cost incurred by the hotel industry due to the effect long term power outages.

Table 5: Cost Incurred by the Hotel Due to Power Outages

Additional Costs	Is there any additional cost when there is power outage?	
	Yes	
	Frequency	Percent
Cost of alternative power supply	88	27.9
Damage of plant and equipment	72	22.9
Perishability of items	68	21.6
Additional maintenance cost	87	27.6
Total	315	100.0

Respondents indicated: cost of alternative power supply, damage to plant and other equipments of the institution, perishability of items and additional maintenance cost. Findings from Table 5 indicates that cost of alternative power supply (27.9%), damage of plant and equipment (22.9%), perishability of items (21.6%) and additional maintenance cost (27.6%). Electrical Power, in the short span of two centuries, has become an indispensable part of modern day life. Our work, leisure, healthcare, economy, and our very livelihood depend on a constant supply of electrical power.

A temporary stoppage of power can potentially lead to relative chaos in our daily activities and also big monetary setbacks in investment trading companies and possible loss of life. Electricity power outages cause enterprises to experience acquiring alternative power supply, damaged plant and equipment, destruction of product and additional maintenance cost due to poor service quality from electricity producing and distribution companies and this result in destroying goods and machinery and thus increase their overhead production cost (NDPC, 2008; AGI, 2009).

Regression Analysis

Regression analysis was applied to establish the impact of power outage ((‘Dumsor’), dependent variable) to redundancy[1], perishability of items[2], cost of alternative power supply[3], damage to plant/equipment/appliances[4] and maintenance cost[5] (independent variables) on the hotel industry in Ghana.

Table 6: Summary of Regression Model

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.987 (a)	0.899	0.881	0.1276

Predictors: (Constant), 1, 2, 3, 4 and 5

According to the result on Table 6, power outage (‘Dumsor’) accounted for 90% (R Square, 0.899) of

the total variation in the cost of 1, 2, 3, 4, and 5 (redundancy[1], perishability of items[2], and cost of alternative power supply[3], damage to plant/equipment/appliances[4] and maintenance cost[5]). Findings on Table 6 also show that an estimation of power outages ('Dumsor') using the model can only be wrong by 12% (0.1276).

Table 7: Analysis of Variance

Model	Source	Sum of Squares	d.f.	Mean square	F	Sig.
1	Regression	52.875	5	10.575	93.584	0.000
	Residual	10.621	94	0.113		
	Total	63.496	99			

a. Predictors: (Constant), 1, 2, 3, 4, and 5.

b. Dependent variable: Power outage ('Dumsor')

Analysis of variance (ANOVA) test revealed an F-value of 93.584 and a P-value of 0.00. As observed, the P-value is far less than the alpha level ($\alpha_{0.05}$) thus implying that the dependent variables contributed significantly to the variations in the dependent variables. The results are consistent with the study by Boasiako (2011), NDPC (2008) and AGI (2009) which revealed that poor service quality from the electricity producing and distribution companies and unreliable power supply will result in 1, 2, 3, 4 and 5 (redundancy[1], perishability of items[2], cost of alternative power supply[3], damage to plant/equipment/appliances[4] and maintenance cost[5]).

Table 8: Regression Coefficient

Model	Un standardized Coefficients		Standardized Coefficients	T-value	P-value
	B	Std. Error	Beta		
Constant	0.663				0.051
1. Redundancy	0.401	0.098	0.467	1.393	0.000
2. Perishability of items	0.228	0.078	0.214	1.939	0.001
3. Cost of alternative power supply	0.426	0.039	0.444	3.475	0.000
4.Damage to plant/equipment/items	0.218	0.037	0.213	2.512	0.000
5. Maintenance cost	0.316	0.121	0.336	3.397	0.003

a. Dependent variable: Power outage ('Dumsor')

The regression coefficient (see Table 8) shows that an increase in power outages by one unit will increase and worsen the situation (redundancy[1], perishability of items[2], and cost of alternative power supply[3], damage to plant/equipment/appliances[4] and maintenance cost[5]) by 0.401, 0.228, 0.426, 0.218 and 0.316 respectively.

5.0 Conclusions of the Study

Generally, on Ghana's issue of dumsor (power shedding) across the nation over the past three years, one can only imagine how much money the country has lost; the unemployment it has generated, how many people have died and how many investors have withdrawn their decision to invest in Ghana as a result of the consistent uncontrollable and unreliable power supply in Ghana. One thing worth considering is, that the hotel industry and in general businesses in the homeland cannot accept disruptions caused by power blackouts, much as they cannot estimate the true cost and impact that it can have on their operations. On other hand, businesses in Ghana turn not to bother at-all to calculate how much money/profit can be lost due to even occasional power interruptions; simply because, power failures, and indeed, long power outage is something very common and seen as normal. The World Bank cited Ghana in its Enterprise Survey on African countries in 2013, as one of the biggest barriers to growth of the country's economy, and hindrance to many multinational investors. The issue of unreliable power supply has been the main potential contributor to the large productivity on the hotel industry. Insufficient and unsustainable power supply is a major problem in Ghana today. The first major consideration in any feasible studies for any multinational hotel company is to invest in developing country is the assurance of a sufficient and reliable power supply.

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