



Effects of the Sudden Power Outages in the Apparel Industry: A Case of Sri Lanka

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ABSTRACT

Apparel manufacturing industry is one of the biggest export industries in Sri Lanka. Power and energy are two most important factors which have an impact on profitability in this sector. This research was carried out to examine the impacts of power outages on firms' profitability. Secondary data from the World Bank Enterprises Survey 2010 was used for the analysis. Descriptive statistics and multiple regression analysis were conducted to test the hypothesis. Results indicate that the number of power outages in the firm has negative effect on profitability of the firm highlighting the importance of investments in backup power facilities.

KEYWORDS: Apparel Industry, Power Outages, Sri Lanka, Profitability

1 INTRODUCTION

With the ongoing rapid technological development, most of the industries are upgraded by latest related technologies. Thus, electricity, and external power sources are major and significant drivers of the industrial sector.

In the industrial context of Sri Lanka, the apparel industry can be identified as the main sector which earns a larger profit for the country.

Sri Lanka is still a developing country and Hydro Power Electricity is the main source of Electricity. Because of that reason, according to the capacity of the country, the technology used for manufacturing and distributing the electricity is at a lower level. As a result of this, the reliability of the service is low. Therefore, the experiences of sudden power outages and voltage fluctuations are common in electricity for domestic and also for the industrial consumers. In domestic usages it may not be a critical issue when occurring power outage or voltage fluctuations. But in the Industrial context the effect is so critical for some industries. Sometimes it may create huge losses for the organizations.

In this case, the above mentioned issue may be a significant issue that is directly affecting the factory productivity and the product quality in factories in apparel industry.

This study was conducted to identify the level of the effect of sudden power

outages and voltages fluctuations on the efficiency and the quality of the products in a selected industry. Further, financial impact of the loss as a ratio of the annual sales of the organizations was also calculated.

2 LITERATURE REVIEW

By reviewing the literature on the selected field, there are a few numbers of papers have been published. When referring them the important factors regarding the power consumption, Energy usages and effect of power outages on the different contexts can be identified.

In Cerný M.(2013) has explained about the energy ladder. It has been pre-defined by the World Bank. It says "Electricity sits highest on the energy pyramid, also known as the energy ladder. The energy ladder refers to the phenomenon of households and firms and so, in aggregate, countries shifting from low-efficiency fuels to high-efficiency ones as income per capita increases. Biomass fuels such as dung and fuel-wood are at the bottom of the energy ladder and electricity at the top". [World Bank (2008), p.31]."

According to (Poudineh and Jamasb, 2015) the modern economies are crucially and increasingly dependent on the services of a reliable power sector. A power outage shock propagates rapidly and affects the whole economy through direct and indirect

effects. These effects are more apparent in industries with higher levels of interdependency with the power sector.”

It has been revealed that, by following authors from their studies, that the unreliable power leads to the disruptions in production, the loss of perishable goods, damage to sensitive equipment and loss of orders in the organizations. (Oshikoya T. & Hussain N, 2001).

The high number of hours without power, as well as high percentage of output lost due to electricity disruptions must therefore have a negative effect on productivity. Power outages reduce productivity by about 3% in Nigerian context. (Mayo, 2012).

According to the study in Sri Lanka, they have proved that, both planned and unplanned supply interruptions have an adverse impact on the GDP of a nation. Not only the industrial sector, but also the general public is affected by power interruptions domestically (Nexant SARI/Energy, 2003).

When searching for the alternative solutions for the headed issue, it can clearly identify that the usage of power backup generators is mainly focused on that. In an African country, Ghana has conducted research on that point. The result was 22.4% of the MSI dressmakers have acquired generators as standby sources of power in Ghana (Braimah & Amponsah, 2012).

3 METHODOLOGY

3.1 Research Design

As the initial stage of the research, the research problem is needed to be identified relating to the research area. In the next stage, literature review was referred for designing the structures and formats of data collection methods in the sudden power outages in the production floor. Through the past records, variables were identified for checking the level of significance on the related research problems. Data were collected from the above identified variables

in the next stage. The analysis was done using the suitable statistical models for the acceptance or the rejection of the assigned variables. According to the analysis results, the conclusion was built up by providing the solutions for the identified research problems and suggestions were provided on the resulted information.

3.2 Data Collection

The main data type that used for this research is secondary data. The dataset extracted from the Enterprise Survey dataset from the web site of the World Bank was referred (World Bank Group, 2016).

In the survey dataset, the whole number of sample of the industries is 610 in Sri Lanka. Among them 310 companies are in the manufacturing sector. Through the manufacturing firms, 127 are garment and textile manufacturing companies. This filtered sample was selected for this study. Further, a leading multinational apparel firm was selected as a case study and quantitative analysis using survey data was complimented by the analysis of the case study.

3.3 Data Analysis

Both SPSS statistical analysis package and Stata were used to analyze the data in the study. SPSS was used in descriptive analysis and normality test of the variables. Stata was used to test the hypothesis and for some regression analysis using Tobit model. One sample p value-test was used to test the hypothesis. The hypotheses were developed according to the following dependent variables. All the data were then further analyzed with 95% confident level.

Independent variables: Legal Status, Location, Scale by No. of Employees, No. of Power Outages, Sector, Scale by Annual Sales

Dependent variable: Annual loss by the Power Outages

Further, Correlation analysis was conducted to identify the association between the variables and to check any multicollinearity.

4 RESULTS & DISCUSSION

According to the Shapiro-wilk test the dataset was normally distributed. Therefore, the relevant statistical methods were used for further analysis.

The correlation analysis shows that there is a significant relationship between the annual loss by the power outages and the number of power outages, Scale by the annual sales of the firm.

The resulted equation from the regression model at 95% significant level is as follows.

Annual loss for the power outages = 5.772 + 0.611 No. of Power outages – 0.946 Scale by annual sales

Here, there is a positive relationship between the no. of power outages and the negative relationship between the scale by the annual sales with the dependent variable; annual loss for the power outages.

The relationship between the experience of power outages in the firm and scale of the

firm by the annual sales is shown in the following chart. It clearly describes that the most of the firms are large scaled and they are experiencing power outages. Among the small scale firms the most of the firms are also experiencing PO.

Table 02: Correlation Analysis

	Annual l_Lo	Age_o f_Firm	No_of _avg_ PO_pe r_mon th	secto r	Scale N
Annual_Lo	1.000	.055	.153	-.056	-.070
Age_of_Firm	.055	1.000	-.014	.080	-.071
No_of_avg_PO_per_month	.153	-.014	1.000	-.029	.011
Sector	-.056	.080	-.029	1.000	.108
ScaleN	-.070	-.071	.011	.108	1.000

Table 01: Regression Analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0 % Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	5.772	.854		6.758	.000	4.071	7.472
Legal status	.139	.138	.123	1.004	.319	-.136	.414
Located in Ex.Pro or IP	.164	.340	.052	.482	.631	-.513	.840
Scale by number of Employees	.116	.121	.111	.961	.340	-.124	.356
Log No of PO	.611	.280	.234	2.182	.032	.053	1.168
sector	-.314	.419	-.081	-.749	.456	-1.147	.520
Scale by Annual Sales	-.946	.338	-.296	-2.796	.007	-1.620	-.272

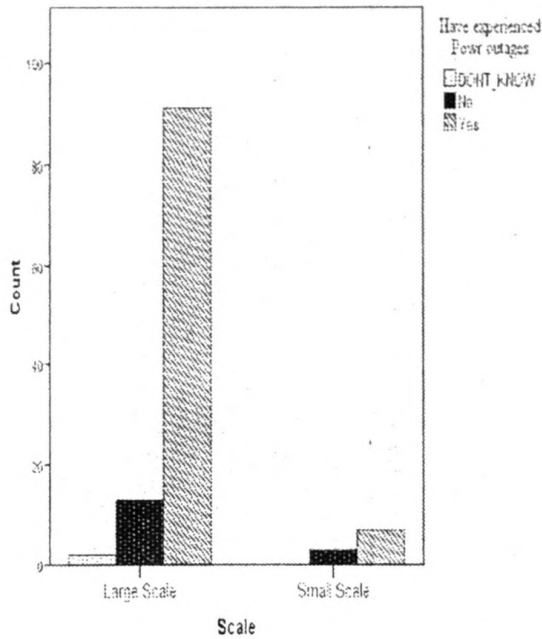


Figure 2: Relationship between the Scale and Experience of PO

As an alternative solution, the usage of backup generators has been analyzed by using the selected case study.

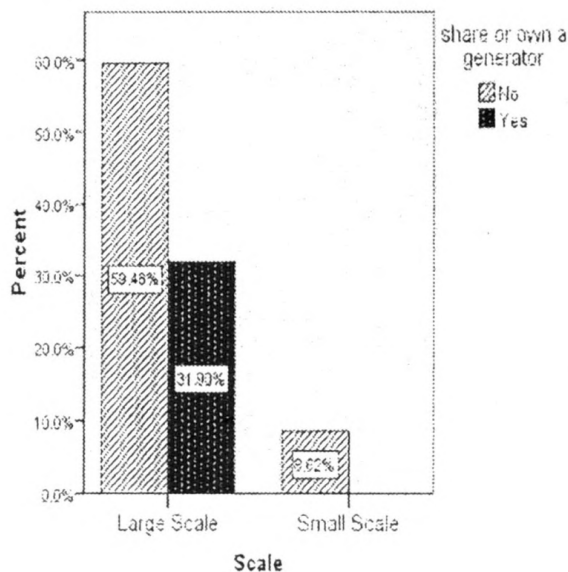


Figure 3: Relationship of Backup Generator Usage and the Scale of the Firm

By referring to the above results in Figure 3, it can be concluded that the best

solution for the decrease of the annual loss of the firm by the power outages is to use the backup generators as an alternative power source.

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