

FNAS Journal of Mathematical Modeling and Numerical Simulation

Print ISSN: 3027-1282

www.fnasjournals.com

Volume 2; Issue 4; December 2025; Page No. 22-30.

DOI: <https://doi.org/10.63561/jmns.v2i4.1120>

Impact of Employment Generation, Insecurity, and Cashless Monetary Policy on the Performance of Small and Medium Enterprises in Nigeria

***¹Onu, O.H., & ²Nelson, M.**

¹Statistics Department, Ignatius Ajuru University of Education, Port Harcourt, Rivers State, Nigeria.

² Statistics Department, Isaac Boro College of Education, Sagbama, Bayelsa State, Nigeria. .

***Corresponding author email:**onuobinekehenny@gmail.com

Abstract

This study examined the impact of employment generation, insecurity, and the cashless monetary policy on the performance of small and medium enterprises (SMEs) in Nigeria. Using data obtained from the Central Bank of Nigeria and the National Bureau of Statistics covering the period 2004–2021, multiple regression and correlation analyses were applied. The regression results revealed that employment generation has a strong positive and statistically significant effect on SMEs, insecurity exerts a negative and insignificant influence, while the cashless policy measured through Point of Sale (POS) transactions also shows a negative but insignificant effect. The model explained 86.94% of the total variation in SME performance. The findings indicated that employment generation is the major driver of entrepreneurial growth, whereas insecurity and the cashless policy implementation have not yielded significant improvement. The study recommends a more secured business environment, better enforcement of digital transaction policies, and stronger job creation initiatives to enhance SME performance in Nigeria.

Keywords: Regression analysis, correlation, SMEs, entrepreneur, insecurity, employment, Point of Sales.

Introduction

Small and medium enterprises (SMEs) are the backbone of most developing economies, providing employment opportunities and contributing significantly to GDP growth. In Nigeria, SMEs play a crucial role in job creation and economic diversification. However, despite various government interventions, the sector continues to face severe constraints, including high levels of insecurity, unstable government policies, and poor access to finance. In the past decade, Nigeria has witnessed multiple recessions caused by fluctuations in crude oil prices, insecurity, and economic mismanagement. Consequently, policymakers have emphasized entrepreneurship as a viable strategy for sustainable economic development. Employment generation and the cashless monetary policy were introduced to promote efficiency and reduce financial bottlenecks. Nonetheless, the persistent insecurity and the uneven implementation of cashless initiatives have constrained SME growth. Previous studies (Angela & Dominic, 2019; Anthony & Rauf, 2020) have shown that insecurity discourages investment, while government policies have often failed to provide a conducive environment for SME development. Therefore, there is a need to empirically assess how these factors collectively influence SME performance in Nigeria.

Nigeria experienced recessions in recent years due to the declining prices of crude oil which is the major source of foreign revenue for the economy. The only hope for a quick rebound of the Nigerian economy and the creation of more jobs for the burgeoning population is the small and medium business enterprise (SME). In doing this, a narrative on how some critical factors affect SMEs is required. Statistical models study patterns and variations in data sets to ascertain what produces and impacts them. Studying these patterns/variations together is necessary because it helps in exposing the underlying relationships among the data sets (Victor-Edema & Essi 2016).

Unemployment has been a serious problem facing Nigeria as a country and all the states and LGAs. The Federal Government of Nigeria has failed to embark on massive employment of youths for over 10 years now, likewise the State Governments. The unemployment rate in Nigeria saw no significant changes in the year 2021 as compared to the previous year 2020, which remained at about 9.79%. The unemployment rate can be viewed as the share of the workforce that is currently not working but is actively searching for work but does not include the economically non-active population. According to International Labour Organization (ILO), as part of its measures for Government to recover from the harsh economy, job creation must be involved. They saw the urgent need to reduce the risk of long-term unemployment and increased informal work hence the following were recommended; 1) Boosting effective demand 2) Small and medium-sized enterprises (SMEs) and micro-enterprises 3) Employment guarantee schemes among others. Employment generation is a natural process of social development. In simple terms, it means the creation of job opportunities to make them busy with their task and assignment.

Insecurity simply means when a country, state, local government, or even community is experiencing some kind of unrest occasioned by unlawful killings, kidnapping, cultism, and many more that leads to economic downfall. Daniel, (2019) established a strong correlation between security and economic growth, businesses and investments cannot strive in an unsecured environment. The Global Terrorism Index (GTI) reported that Nigeria has two of the five deadliest terrorist groups in the world namely; the Boko Haram and the Fulani extremists. In the year 2020, Nigeria was rated as the 3rd worst country with insecurity level, behind Afghanistan and Iraq. Statistics have shown that insecurity level has rendered over 10 million Nigerian children out of school, especially in the Northern part of the Country and this is the highest in the world.

Entrepreneurship is the readiness and the ability of a person to organize, develop and run a business enterprise with any of its uncertainties in order to make a profit. It simply means starting a new business with all the necessary analysis put in place to ensure success in the business. In this research, small and medium-scale enterprises were used in measuring Entrepreneurship. Small and medium-scale enterprise is a very crucial tool that drives development in a country. SMEs accounted for almost 90% of employment generation in developing, developed, and underdeveloped countries.

Electronic banking can be described as using the internet as a distribution mode for the provision of banking services like electronic bill payment, opening a deposit account, online money transfers, online cash withdrawals, etc. Allen, (2017) defined electronic finance (e-finance) as the provision of financial services and markets using electronic communication and computation. Electronic banking has also been defined by Laford and Li, (2015) as the medium of using electronic devices, like the internet, wireless connections, networks, ATMs, and cell phones in banking services. Daniel, (2019) describes electronic banking as the provision of banking services to customers through internet technology. Electronic banking is defined to include the provision of retail and small-value banking products and services through electronic channels as well as large-value electronic payment and other wholesale banking services delivered electronically.

Angela and Dominic, (2019) in their research of the effect of insecurity on micro, small and medium enterprises found that insecurity has adverse consequences on business, because it discourages business operators from expanding their business or make new investment. Also, Anthony and Rauf, (2020) used multinomial logistic regression in studying the impact of Government policy and insecurity on SMEs in Nigeria. It was found that Government policy of multiple taxation resulted in the rising of cost of the SMEs investments. They stated that Government policy has not been able to impact significantly on the promotion of SMEs in Nigeria.

The Government towards the end of the 1990s saw that there has been a pattern shift as electronic commerce was seen as the alternative means of conducting financial transactions over the internet. (Central Bank of Nigeria, 2017). In the year 2012, the apex bank decided to merge the internet and banks. It also decided to introduce the cashless Nigeria Policy to curb the excess in the handling of cash in the country. This policy led to the introduction of alternative means of payment such as the use of the Point of Sale (POS). POS is the time and place where a retail transaction is completed

Statement of the Problem

Despite several government initiatives aimed at promoting employment, ensuring security, and improving financial

inclusion through the cashless policy, Nigeria's SME sector continues to underperform. Rising insecurity manifested in kidnapping, insurgency, and armed robbery has discouraged investment and business expansion. Similarly, the cashless policy, designed to enhance financial efficiency, has faced infrastructural and operational challenges, limiting its potential to benefit small businesses. Moreover, the link between employment generation, insecurity, and cashless policy implementation and their joint impact on SMEs has not been adequately examined in the Nigerian context. This study, therefore, seeks to bridge this gap by evaluating the combined effects of these variables on SME performance.

Aim and Objectives of the Study

The study is aimed at assessing the Impact of employment Generation, Insecurity and Cashless Monetary Policy on the Performance of Small and Medium enterprises in Nigeria, while the objectives include;

1. Examine the effect of employment generation on the performance of SMEs in Nigeria.
2. Investigate the impact of insecurity on SME development.
3. Evaluate how the cashless monetary policy (measured by POS transactions) influences SME performance.

Materials and Methods

The materials and methods in this research were applied as seen in Onu and Inamete (2022). The multiple linear regression model employed in this study is given as;

$$SMEs = \beta_0 + \beta_1 Employ + \beta_2 Insec + \beta_3 POS + \varepsilon \quad (1)$$

where

SMEs represents small and medium scale Enterprises

Employ represents Employment generation,

Insec represents Insecurity and

POS represents Point of Sale

The study will employ multiple regression analysis with SMEs as the response variable while, Employment generation, Insecurity, and POS withdrawals will be used as the predictors. It will estimate the following parameters, β_0 (Grand Mean or the value of the SMEs in equation 1 when all the other predictor variables have zero contributions to the response variable), β_1 , β_2 and β_3 are respectively the gradient or the coefficients of Employment, Insecurity, and POS variables.

The input matrix which is the matrix of Employment, Insecurity, and POS is generally given as

$$X = \begin{pmatrix} x_{11} & x_{12} & \dots & x_{1p} \\ x_{21} & x_{22} & \dots & x_{2p} \\ \vdots & & & \\ x_{n1} & x_{n2} & \dots & x_{np} \end{pmatrix} \quad (2)$$

All the input variables otherwise

called explanatory or predictors used in this study were also obtained from the Central Bank of Nigeria and the National Bureau of Statistics (NBS). The data ranges from 2004-2024.

The vector of output variables, which is the vector of SMEs in equation (1) is given generally as

$$\underline{Y} = \begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{pmatrix}, \quad (3)$$

The output is the response variable known as Entrepreneurship measured by small and medium scale enterprises. The data was obtained from the Central Bank of Nigeria (CBN) which ranges from the year 2004-2024.

The weight vector β which is the vector of model parameters is given as

$$\beta = \begin{pmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_p \end{pmatrix}, \quad (4)$$

and the vector of stochastic error \mathcal{E} is given as

$$\underline{\mathcal{E}} = \begin{pmatrix} \mathcal{E}_1 \\ \mathcal{E}_2 \\ \mathcal{E}_3 \end{pmatrix}, \quad (5)$$

Applying the least square equation which is given as

$$\underline{\beta} = (X'X)^{-1}X'Y \quad (6)$$

The variance-covariance matrix is obtained as

$$(X'X)^{-1} = \frac{\text{Adj}(X'X)}{|X'X|} \quad (7)$$

We obtain $X'X$ by multiplying the transpose of X' by Y , hence we proceed to obtain the parameters $\hat{\beta}$ given as seen in (7).

Note that the model in (1) can be written in matrix form as seen in Kutner et al (2005) and Onu and Inamete (2022) as

$$y = X\beta + \mathcal{E}, \text{ where } \mathcal{E} \sim N(0, \delta_e^2 I_n) \quad (8)$$

and I_n represents an $N \times N$ identity matrix.

Application of Analysis of Variance (ANOVA)

The study applied Analysis of variance (ANOVA) to equation (1). In applying the ANOVA, we will obtain the sum of squares of the regression between treatment, sum of square error, and the total sum of square as seen in Keller & Warrack, (2003). The sum of square treatment is used to measure the similarities of the mean samples to each other and is given as;

$$SS_{Treat} = \sum_{i=1}^n n_i (\bar{x}_i - \bar{x})^2 \quad (9)$$

If a large difference is experienced in the sum of square treatment, it means that one or more than sample means will considerably differ from the Grand Mean as seen in Keller and Warrack, (2003). The sum of square error denoted as SSE is given as;

$$SSE = \sum_{j=1}^n \sum_{i=1}^n (x_{ij} - \bar{x}_j)^2 \quad (10)$$

this can also be written by expansion as;

$$SSE = (n_1 - 1)S_1^2 + (n_2 - 1)S_2^2 + \dots + (n_K - 1)S_k^2, \text{ this is expressed in Keller and Warract, (2003).}$$

The study will also compute the mean squares, for which the mean square for treatment is obtained;

$$MS_{Treat} = \frac{SS_{Treat}}{n-1}, \quad (11)$$

$$\text{while mean square error} = \frac{SSE}{N-n} \quad (12)$$

where N is the total sample and n is the number of treatments.

The t statistic used in this research is given as;

$$t = \frac{\hat{m}_0}{S(\hat{m}_0)} \quad (13)$$

where \hat{m}_0 is the estimate of the intercept term in the model with intercept and $S(\hat{m}_0)$ is the standard deviation of the intercept term. For the slope term \hat{m}_1 , the T statistic is given as seen in Kutner et al. (2005);

$$t = \frac{\hat{m}_1}{S(\hat{m}_1)} \quad (14)$$

But $S(\hat{m}_0) = MSE \left[\frac{1}{n} + \frac{\bar{x}^2}{\sum(x_i - \bar{x})^2} \right]$

$$SSE = \sum (y_i - \hat{y}_1)^2$$

$$SStotal = \sum(y_i - \bar{y})^2$$

and

$$SSR = \sum(\hat{y}_i - \bar{y})^2$$

and

$$MSE_R = \frac{\sum(y_i - \hat{y}_i)}{n-2} = \frac{SSE}{n-2}$$

$$MSE_{Reg} = \frac{\sum(\hat{y}_i - \bar{y})}{n-2} = \frac{SSE}{1} = SSR$$

A typical example of a one-way ANOVA is shown in Table 1

Table 1: One Way ANOVA

Source of Variation	Df	SS	MS	Fcal
Treatment (B/W)	(k-1)	SS_{treat}	MS_{treat}	$\frac{MS_{treat}}{MSE}$
Error (within)	$(\mu - k)$	SSE	MSE	
Total	$(\mu - k)$	SST		

Coefficient of Determination

The Coefficient of determination applied in this study is given as;

$$R^2 = \frac{SSR}{SSTotal} \quad (15)$$

$$= 1 - \frac{SSE}{SSTotal} \quad (16)$$

The value of the coefficient of determination lies between 0 and 1, the more the value is close to one, the better the model fit on the data, while as the value gets nearer to zero, the inferior the model fit. Another test statistic to be applied is the adjusted Coefficient of Determination given as

The adjusted R squared is given as

$$R^2_{Adjusted} = \left(\frac{n-1}{n-p} \right) \left(\frac{SS_{Error}}{SSTotal} \right) \quad (17)$$

$$= 1 - \frac{MSE}{\frac{SSTotal}{n-1}} \quad (18)$$

The above was also applied to further strengthen the claim made by the R-squared, since it is sensitive to the parameters of the model, hence its value could be misleading at times, as a result, the adjusted R-squared that is not affected by an increase in the parameters of the models was applied.

Correlation Analysis

From the coefficient of determination, we obtain the Person's correlation coefficient given as

$$r = \pm \sqrt{R^2} \quad (19)$$

where $-1 \leq r \leq 1$, if $r = -1$ we say that there is a perfect negative relationship, while if $r = 1$ we say that there is a perfect positive relationship between the variables. If $r = 0$, there is no relationship between the two variables.

1. Results

Regression Analysis: SMEs versus EMPLOYMENT, INSECURITY, POS

Regression Equation

$$\text{SMEs} = -1953942 + 564832 \text{ EMPLOYMENT} - 2.6 \text{ INSECURITY} - 0.000000 \text{ POS}$$

Table 2: Estimates of the model Coefficients

Term	Coef	SE Coef	T-Value	P-Value
Constant	-1953942	391826	-4.99	0.000
EMPLOY	564832	83513	6.76	0.000
INSEC	-2.6	11.5	-0.22	0.826
POS	-0.000000	0.000000	-1.72	0.108

Table 3: Model Summary (Estimates of the coefficient of determination

S	R-sq	R-sq(adj)	R-sq(pred)
408175	89.24%	86.94%	0.00%

Table 4: Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	3	1.93526E+13	6.45086E+12	38.72	0.000
EMPLOY	1	7.62121E+12	7.62121E+12	45.74	0.000
INSEC	1	8390671150	8390671150	0.05	0.826
POS	1	4.91497E+11	4.91497E+11	2.95	0.108
Error	14	2.33249E+12	1.66607E+11		
Total	17	2.16851E+13			

Correlation Analysis of EMPLOYMENT, INSECURITY, SMEs, POS

The result is presented in the table 5 as seen below

Table 5: Correlations

	EMPLOYMENT	INSECURITY	SMEs
INSECURITY	-0.174		
SMEs	0.932	-0.184	
POS	0.865	-0.140	0.731

Discussion

Employment Generation and SME Performance

The regression results indicate that employment generation has a strong positive and statistically significant effect on SME performance ($\beta_1 = 564832, p < 0.05$). This suggests that as job creation increases, the level of entrepreneurial activity also rises, confirming the critical role of employment generation in fostering small business development. This finding aligns with the ILO's position that job creation directly enhances economic recovery and business sustainability.

Insecurity and SME Performance

The coefficient of insecurity ($\beta_2 = -2.6, p = 0.826$) was negative and statistically insignificant. This implies that rising insecurity, though detrimental, does not currently exert a statistically measurable effect on SME performance due to possible regional variations or business resilience strategies. Nonetheless, the negative sign confirms that insecurity discourages investment and entrepreneurial activities.

Cashless Monetary Policy and SME Performance

The cashless policy, measured by POS transactions ($\beta_3 = -0.000000, p = 0.108$), also shows a negative but insignificant effect on SME growth. This suggests that the cashless system has not yet translated into tangible benefits for small

business operators, possibly due to poor infrastructure, unreliable network services, and limited access to digital payment tools among rural SMEs.

Model Strength and Correlation Analysis

The model's coefficient of determination ($R^2 = 0.8924$) indicates that approximately 89.24% of the variation in SME performance is explained by the three independent variables. The correlation analysis further reveals that employment generation and SMEs are strongly correlated ($r = 0.932$), while insecurity shows a weak negative correlation ($r = -0.184$). This supports the conclusion that employment generation is the most significant driver of SME performance in Nigeria.

Recommendations

The following were recommended:

1. The Nigerian government should intensify security measures, particularly in regions prone to terrorism and kidnapping, to restore investor confidence and protect small business owners.
2. Employment programs focusing on skill development, entrepreneurship training, and access to credit facilities should be expanded to promote SME sustainability.
3. The Central Bank of Nigeria should ensure the effective implementation of the cashless policy by improving internet connectivity, reducing transaction charges, and promoting awareness campaigns among SMEs.
4. Government agencies should create more accessible funding platforms for SMEs, particularly in rural areas where digital transaction adoption is low.

Conclusion

This study assessed the Impact of Employment Generation, Insecurity, and Cashless Monetary Policy on the Performance of Small and Medium Enterprises in Nigeria using a multiple regression and correlation approach. The findings provided valuable insights into how these critical macroeconomic and socio-political factors influence entrepreneurial development in the country. From the analysis, employment generation was found to have a positive and statistically significant effect on the growth and development of SMEs, indicating that policies that promote job creation directly enhance entrepreneurial activities and stimulate economic growth. Conversely, insecurity showed a negative but statistically insignificant impact on SMEs, suggesting that while insecurity hampers business operations and investor confidence, its effect may vary across sectors and regions. The cashless monetary policy, measured through POS transactions, exhibited a negative but insignificant contribution to SME growth, implying that while digital payment systems are growing, their influence on entrepreneurship remains limited, likely due to implementation challenges, infrastructural inadequacies, and low financial literacy among small business operators. The coefficient of determination (R^2) indicated that approximately 86.94% of the variation in SME development could be explained by the combined influence of employment generation, insecurity, and the cashless policy, signifying that the model fits the data well. The ANOVA results confirmed that the overall regression model is statistically significant, validating the relationships among the variables. Overall, this study concludes that entrepreneurship and SMEs remain pivotal to Nigeria's economic progress, serving as effective instruments for job creation, poverty reduction, and sustainable growth. However, the full potential of SMEs cannot be realized in the absence of security and stable policy frameworks. Therefore, improving security, encouraging employment-driven programs, and refining the implementation of cashless monetary policies will strengthen the contribution of SMEs to Nigeria's economic development. In essence, SMEs represent a viable pathway to addressing Nigeria's pressing socioeconomic challenges, especially unemployment and insecurity, while aligning with modern digital financial trends. A holistic policy approach that integrates entrepreneurship promotion with employment generation and security reform is essential for achieving inclusive and sustainable national growth.

Recommendations

The study recommends the following:

1. The security level in Nigeria should be improved in Nigeria by the government making and implementing laws that are unfriendly to the culprits, and they should stop empowering the cultists in Nigeria.

2. The embargo on employment in all sectors of the economy should be lifted, as this will help in improving the SMEs and the economy of Nigeria.
3. The cashless policy as measured by the POS should be reviewed since it has no impact on the Nigerian economy.

References

Allen, O. (2017). Electronic Banking in Banking Industries and its Effects. *International Journal of Investment and Finance*, 3(1), 10-16

Angela, O. O. & Dominic, O. E. (2019). Effect of Insecurity on micro, small and medium enterprises (MSMEs) Development in Benin City, Edo State. Arena publications. *international journal of business management*. 4(3), 75-86.

Anthony, H. & Rauf, R. I. (2020). Impact of Government policy and insecurity factors on small and medium enterprises (SMEs) productivity in Nigeria. *European journal of business management and research*, 5(6), 1-8.

Daniel, H. (2019). Importance of e-payment on Clearing and Forwarding. *Daily Sun*, P.A.8.

Keller G. & Warrack B. (2003). *Statistics for management and economics* (6thed): Thomson Brooks /Cole – 603-641.

Kutner M. H., Nschtsheim C. J., Neter J. and Li W. (2005). *Applied linear statistical model*, fifth edition, McGraw-Hill: a Irwin, Boston Burr Ridge, IL Dubuque, IA Madison, WI New York San Francisco St Louis Bangkok Bogota Caracas Kuala Lumpur Lisbon London Madrid Mexico City Milan Montreal New Delhi Santiago Seoul Singapore Sydney Taipei Toronto.

Laford, M. & Li, K. (2015). *Challenges for monetary policy: new and old Bank of England Quarterly Bulletin*. November, 397 - 415.

Onu, O.H. & Inamete, E.N.H., (2022). Computational and comparative study of the impact of corporate Governance on financial performances of quoted insurance companies in Nigeria. *International Journal of Science Academic Research*, 3(2), 3475-3482.

Victor-Edema, U. A. & Essi, I. D. (2020). A transfer function modelling of Nigeria current account (net) and exchange rate. *International Journal of Statistics and Applied Mathematics*. IJSAM. 5(4), 177-185. DOI:<https://doi.org/10.22271/math2020.v5.i4c.564>.

APPENDIX A:Pareto and Residual plots in Figure 1 and 2 respectively.

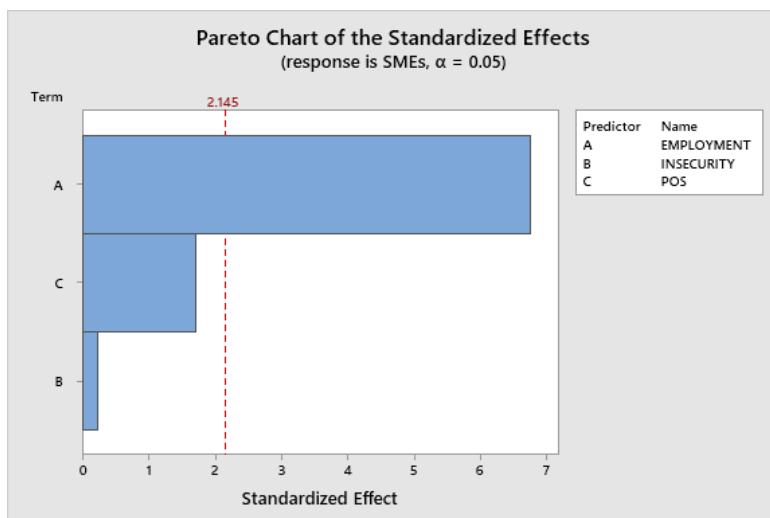
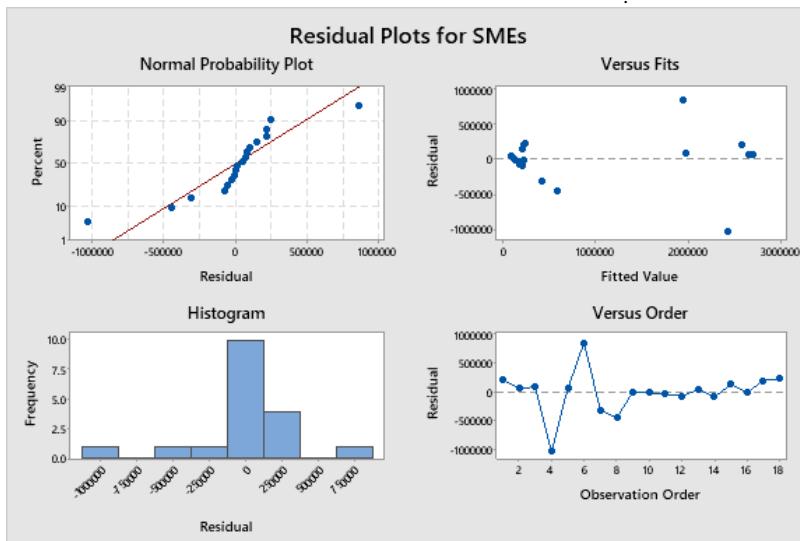


Figure 1: Pareto chart of the predictor variables



Figur 2:Residual plots of SMEs