

# Materials Management as a Panacea for the Performance of Small and Medium-size Enterprises: Evidence from Kogi State

## ABSTRACT

*This study focused on the effects of materials management on the performance of SMEs in Kogi State. For this study, the method used was research survey design. The population of the study comprised of the SMEs in food processing and manufacturing industries in the Eastern Senatorial District of Kogi State. A multi-stage sampling was used to select 384 SME owners in Kogi State. Descriptive statistics, Multiple Regression and Ordered Probit Regression were used for analysis. Findings show that material planning and over-stocking of materials have significantly positive effects on profitability of SMEs in Kogi State; while under-stocking of materials have significantly negative effect on profitability of SMEs in Kogi State. Finding further shows that persistent material under-stocking significantly causes customer's satisfaction of SMEs in Kogi State to decrease. The study concluded that materials management is critical to the achievement of desired performance of SMEs. It was recommended that SME owners should engage in effective material planning and keep over-stocking of materials moderate. The implication of this is that profitability and customer's satisfaction of SMEs in Kogi State will be enhanced if materials are properly managed.*

**Keywords: Inventory, Inventory Control, Customers' Satisfaction, Procurement, Profitability, Business Environment**

## 1. INTRODUCTION

Recently, Small and Medium-size Enterprises (SMEs) appears to have faced material procurement, inventory and supply challenges. These are crises obviously posed by the economic recession to SME sector. According to Asaolu, Agorzie and Unam (2012), SMEs invest "a considerable amount of capital on materials". This investment on material is essentially required for the survival of SMEs. It is also back up with the fact that operations of SMEs must be unobstructed, and the enterprise their competitive power must be established. Unfortunately, SMEs are observed often engaged in the procurement of low quality materials and unapplaudable inventory managerial approach to reduce cost. The SME owners are not conversant with the fact that material costs are varying parameters. In previous study, Ogbadu (2009) tried to establish that apart from basic price of materials, other varying costs attached to materials acquisition are purchasing cost, marketing cost, obsolescence and wastages.

However, It may be wrong for SME owners to focus only on the procurement of the best quality materials without adequate attention on material planning and control. The application

37 of planning and control to the management of materials is for effective operations of SMEs.  
38 Akindipe (2014) posited that the significant of material management to the effective and  
39 efficient operation of SMEs cannot be disputed.

40 The management of materials by SME owners requires a very good attention in order to  
41 achieve uninterrupted production runs and enhanced performance in operations (Khalid,  
42 2008). The performance of SMEs (in terms of customer's satisfaction and profitability) is  
43 believed to also depend on material management and functions. Akindipe (2014) stressed that  
44 the "material management function is assumed to be organised and operated on an integrated  
45 basis and is also presumed to be responsible for material forecasting, planning, inventory  
46 control, scrap control and disposal; providing management information regarding purchases  
47 and inventories within the framework of the financial policies and norms" (p.37). The main  
48 rationale behind inventory control in material management is to prevent materials  
49 understocking and overstocking.

50 Though, there have been studies conducted on the effects of material management on the  
51 performance of SMEs in many countries. Oyebamiji (2018) added that previous studies have  
52 convergent opinions on the relationship between the materials management and organization  
53 performance. The effects of materials understocking and overstocking on the performance of  
54 SMEs still lack research attentions. It is observed also that the relationship has not been  
55 extracted in Nigeria, due to the interplay between the controllable and uncontrollable  
56 environment of SMEs (controllable- organizational design, key workforce, functions and data  
57 base; and uncontrollable- political, technological and economic). Interestingly, it is observed  
58 that SMEs adopt low quality and quantity approach to cope with the hit by the interplay of  
59 these factors in order to adapt with change in the business environment. For instance the bans  
60 on imported materials have led many SMEs into finding alternative local materials; planning  
61 and controlling inventories cheaply to pursue increased customer's satisfaction and  
62 profitability in the Nigerian Business Environment (NBE). SMEs are likely to face threat in  
63 material management when the uncontrollable factors overpower the uncontrollable factors.  
64 Contrarily, opportunities are likely to be utilized when the controllable factors are favourable  
65 and exceed the uncontrollable factors. The factors have much influence on material of the  
66 right quality and quantity.

67 According to Akindipe (2014), 'the availability of the material in the right quality and  
68 quantity will determine to a reasonable extent the availability, quality and quantity of the

69 resultant output'. Meanwhile, it is expected that inventory control as an aspect of material  
70 management will have positive effects on the profitability of SMEs in Kogi State. It is in this  
71 regard that this study will be designed in relation to the business environment of Kogi State.  
72 The study of Gelagay and Hora (2018) has found that higher levels of inventory management  
73 practice can have positive effect on improved organizational performance. The challenge here  
74 is that the actual aspect of the organizational performance is unknown. Other studies  
75 (Ramakrishna, 2005; Ogbadu, 2009; Ondiek, 2009) identified turnover as a measure of  
76 performance, and have shown that materials account for more than 50% percent of it in the  
77 manufacturing firms. Thus, material management is believed to have effects on the  
78 performance of SMEs (profitability and customer's satisfaction), and studies in this regard  
79 have not been explored in Kogi State. On the general belief, high quality materials attract  
80 high costs of production which may in turn have effect on profitability; but customer's  
81 satisfaction is likely to improve. Few SME owners may adopt quantity increase approach  
82 with high regard for low price. This has the tendency of influencing profitability and  
83 customer's satisfaction. The nature of this influence has not been ascertained in Kogi State.  
84 This study bridged this gap. The specific objectives of the study were to:

- 85 i. Investigate the effect of material management (material planning, understocking and  
86 over-stocking) on the profitability and customer's satisfaction of SMEs in Kogi State.
- 87 ii. Ascertain the effects of factors (increasing purchasing cost, increased marketing cost,  
88 obsolescence due to over-stocking, wastages due to over-stocking and loss of  
89 customer's patronage) on the profitability of SMEs in Kogi State.

## 91 **2. REVIEW OF RELEVANT LITERATURE**

92 Material management is so much connected with value chain and efficiency in the operations  
93 of SMEs. According to Aina *et al.* (2017), "materials management encompasses all  
94 operations management functions from purchasing of raw materials through the production  
95 processes to the final delivery of the end products". This implies that the management of  
96 materials is critical to delivering values to customers. For instance, the management of  
97 materials takes account of what customers really need, how can materials be sourced, what  
98 quantity and quality must be supplied, how can the material supplied be used effectively and  
99 efficiently to deliver a customer's desirable value. Ondiek (2009) added that materials  
100 management brings 'together under one management responsibility for determining the

101 manufacturing requirement, scheduling the manufacturing processes and procuring, storing  
102 and dispensing materials’.

103 Gopakakreshnan and Sundaresan (2006) stressed that material management is concerned with  
104 all activities which are related to the flow of materials, from the supplier's plant through the  
105 manufacturing process, into finished goods warehouse and on to the ultimate users of the  
106 product. In another way, Donyavi and Flanagan (2009) expressed that “material management  
107 is concerned with system for planning and controlling to ensure that the right quality and  
108 quantity of materials and equipment are specified in a timely manner” (p.12). Based on their  
109 view, it is also depicted that material management is planning and control task that takes into  
110 account acquisition cost and on-time delivery to avoid operations shutdown, increase average  
111 cost of producing goods, out-of-stock, and so on.

112 Effective and efficient management of material has so much implication on the overall  
113 performance of SMEs. The management of raw material in a manufacturing organization  
114 therefore deserves attention and critical study in order to achieve uninterrupted production  
115 runs and enhanced performance (Khalid, 2008) in terms of profitability, customer’s  
116 satisfaction, reduced cost and high quality. Aina-David *et al.* (2017) asserted that materials  
117 management is a tool to optimize performance in meeting customer service requirements at  
118 the same time adding to profitability by minimizing costs and making the best use of  
119 available resources. Thus, materials management is the process which integrates the flow of  
120 supplies into, through and out of SMEs to achieve a level of service which ensures that the  
121 right materials are available at the right place at the time in the right quantity and quality and  
122 at the right cost.

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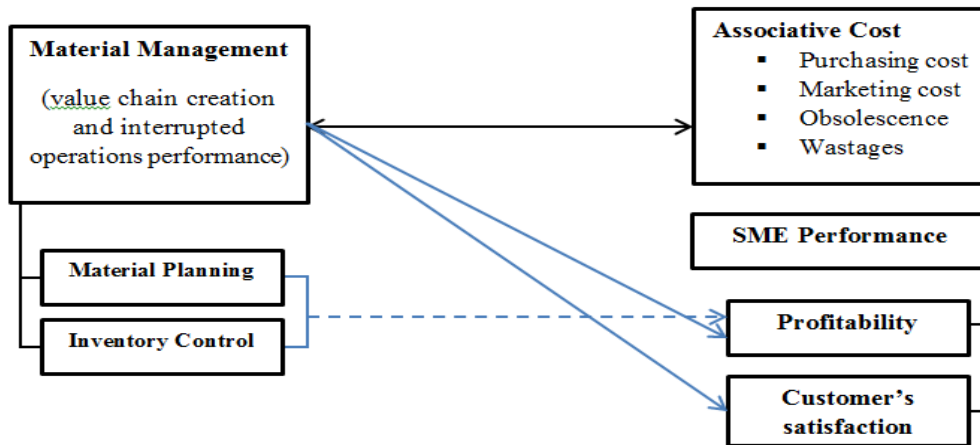
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129 **Fig. 1: Conceptual Framework of Materials Management and Performance**



130

131 **Source:** Adopted from Gopalakrishnan and Sundaresan (2006); Ogbadu (2009); Salome  
132 (2014)

133 Anichebe and Agu (2013) expressed that material management and material planning are  
134 used interchangeably. It is worthy of note that material planning is an arm of material  
135 management. It is in this regard this present study treats material planning as an aspect of  
136 material management. However, it is observed that most SMEs invest largely on material.  
137 This is in no doubt that the operations of the SMEs are grossly dependent on materials to  
138 provide goods that are demanded by customers in a unique way. Ondiek (2009) is of the  
139 opinion that such a large investment requires considerable planning and control so as to  
140 minimize wastage which invariably affects the profitability of organizations. Material  
141 planning is a scientific way of determining the requirements starting with raw materials,  
142 consumables, spare parts and all other materials that are required to meet the given  
143 production plan for a certain period. Though a study (Monday, 2008) considered Materials  
144 Requirements Planning (MRP), purchasing, procurement of materials, inventory control,  
145 storage, materials supply, transportation and materials handling as the activities which affect  
146 the performance of SMEs. In this study, effort is only premised on material requirement  
147 planning and inventory control. These two activities are observed to be influencing the  
148 operations performance of SMEs in Kogi State. SMEs need the materials at the right price  
149 (affordable), at the right quantity (sufficient for operations), in the right quality and at the  
150 right time. Aina *et al.* (2017) expressed that these will help SMEs to co-ordinate and schedule  
151 the production activity in an integrative way for an industrial undertaking.

152 It has been proven in previous studies that effective material management has the tendency of  
153 positively affecting the performance of SMEs. The study conducted by JerutoKeitany,  
154 Wanyoike and Salome (2014) provided this evidence. Some of these studies did not

155 decompose the organizational performance in the course of their survey. Those studies which  
156 decomposed organizational performance only used profitability as a parameter. For instance,  
157 Ibegbulem and Okorie (2015) discovered that material management has the propensity to  
158 contribute to the profitability of organizations. The study of Nwosu (2014) had revealed that  
159 material management has significant effect on profitability of organizations. It is observed  
160 that these studies were conducted on large firms and enterprises. Little or no effort has been  
161 asserted to investigate the same effect on SMEs. This is quite a big loophole, particularly in  
162 Nigeria. In fact, there appears to be a big gap even in the context of large enterprises because  
163 the effect of material management on customer's satisfaction has not been investigated or not  
164 adequately researched. In this study, it is expected that effective material management will  
165 have effect on customer's satisfaction of SMEs in Kogi State. This a-priori expectation  
166 follows the assertion of Achison (1999) who maintained that material management as a  
167 concept requires an organizational structure which often unifies into one functional  
168 responsibility- the systematic planning and control of all material from identification of the  
169 need through delivery to customers. This study upholds that effective material management  
170 can fast-track the supply and management of quality materials that can enhance the  
171 production of quality goods that can satisfy the identified need of the customers.

### 172 **3. RESEARCH METHODOLOGY**

#### 173 **3.1 Research Design**

174 For this research, the method used was research survey design. The design focused on the  
175 collection and data analysis from the study population which enabled the researcher to look  
176 into the causal association connecting the identified variables. The instrument that was used  
177 for the collection of relevant data for the study was be questionnaire.

#### 178 **3.2 Population**

179 The 'complete set of cases from which a sample was selected is called the population whether  
180 it describes human beings or not' (Saunders *et al.*, 2007). For the purposes of this study, the  
181 population comprised of the SMEs in food processing and manufacturing industries in Kogi  
182 State. It appears that there is no adequate record of SMEs regarding Kogi State. There are  
183 many SMEs that are not registered in Kogi State. Thus, this study considered the population  
184 infinite.

#### 185 **3.3 Sampling Technique**

186 A multi-stage sampling was used to select 384 SME owners in Kogi State. The first stage was  
 187 the stratified sampling method. This involved grouping the SMEs according to their location.  
 188 The second stage involved the use of sampling by sectors, and lastly, the stage involved the  
 189 use of simple random sampling method to pick the respondents from SMEs' clusters in Kogi  
 190 State. The simple random technique was used to ensure equal opportunity for the  
 191 participation of SME owners in the population and to prevent unnecessary bias in the  
 192 selection process. The total sample size was 384. This cuts across gender, age, marital status,  
 193 educational qualification and work experience.

194 Cochran's (1977) method outlined in Bartlett, Kotrlik, and Higgins (2001) was adopted to  
 195 determine the sample size. The formula is presented below.

$$n_0 = \frac{t^2 \times p \times (1 - p)}{d^2}$$

197 Where;

198  $n_0$  is the minimum estimated sample size

199  $t$  is the value of the  $t$ -distribution corresponding to the chosen alpha level – for .05 this is 1.96

200  $p$  is the estimate of population proportion\*

201  $d$  is the margin of error – Bartlett *et al.* recommend using 5%

202 \*When  $p$  is unknown, generally it is best to set it at .5

203 Therefore,

$$\frac{(1.96)^2 \times 0.5 \times (1 - 0.5)}{0.05^2}$$

$$\frac{3.8416 \times 0.5 \times 0.5}{0.0025} = 384.16 = 384 \text{ Approximately}$$

### 206 3.4 Variable Measurements

207 In order to achieve the objectives of the study, materials management was measured with  
 208 materials planning, materials under-stocking and materials over-stocking. The rationale  
 209 behind this choice of measurement is that materials planning, materials under-stocking and

210 materials over-stocking are important aspects of materials management. However,  
 211 performance is measured with customer's satisfaction and profitability. These variables have  
 212 been used previously as strong parameters for the performance of SMEs.

213 **Validity and Reliability of Instrument**

214 The study used a well-structured questionnaire to gather data. The questions were sectioned  
 215 into four. The questions were close-ended multiple-choice questions giving respondents a  
 216 choice from a range of answers based on the 5-point Likert-style rating scale. There were  
 217 three items for each construct in the questionnaire. To establish the instruments' validity, a  
 218 panel of experts was consulted. To establish the instrument reliability, the Cronbach  
 219 Coefficient alpha ( $\alpha$ ) was used. The Cronbach Coefficient results are materials planning ( $\alpha =$   
 220 0.78), materials under-stocking ( $\alpha = 0.81$ ), materials over-stocking ( $\alpha = 0.70$ ), profitability ( $\alpha =$   
 221 0.71), customer's satisfaction ( $\alpha = 0.75$ ), increasing purchasing cost ( $\alpha = 0.72$ ), increased  
 222 marketing cost ( $\alpha = 0.80$ ), obsolescence due to over-stocking ( $\alpha = 0.70$ ), wastages due to  
 223 over-stocking ( $\alpha = 0.77$ ) and loss of customer's patronage ( $\alpha = 0.82$ ).

224 **3.5 Method of Data Analysis**

225 The descriptive method of data analysis was employed as analytical tool for the study.  
 226 Descriptive statistics is a potent method used in social science research to describe the  
 227 features of the research sample like percentage, means, and standard deviations (SD). In  
 228 addition this study used Multiple Regression and Ordered Probit Regression for analysis. The  
 229 model that was used in ascertaining the effects of the independent variables on the dependent  
 230 variables of the study has been specified as:

231 ***Objective One: Multiple regression model***

232  $Y = f(X)$   
 233  $y_1 = f(x_1, x_2, x_3) \dots\dots\dots 1$   
 234  $y_2 = f(x_1, x_2, x_3) \dots\dots\dots 2$   
 235  $y_1 = \alpha_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \mu \dots\dots\dots 1$   
 236  $y_2 = \alpha_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \mu \dots\dots\dots 2$

237 Where:

- 238  $y_1 =$  Profitability  
 239  $y_2 =$  Customer's Satisfaction  
 240  $X_1 =$  Material Planning



241  $X_2 =$  Under-Stocking

242  $X_3 =$  Over-Stocking

243 **Objective Two: Ordered Probit Regression Model**

244  $Y^* = x^1\beta + e_1$

245 Where  $y^*$  is the exact but unobserved dependent variable

246  $X$  is the vector of independent variables and

247  $B$  is the vector of regression coefficients which is estimated.

248  $Y = (X_1 + X_2 + X_3 + X_4 + \dots + X_n) + e$

249  $X_1 =$  Increasing Purchasing Cost

250  $X_2 =$  Increased Marketing Cost

251  $X_3 =$  Obsolescence Due To Over-Stocking

252  $X_4 =$  Obsolescence Due To Over-Stocking

253  $X_5 =$  Loss of Customer's Patronage

254  $Y^* =$  Profitability

255  $e =$  Error term

256 **4. DATA ANALYSIS AND RESULTS**

257 **Table 1 Questionnaire administration**

Questionnaire	Frequency	Percentage
Administered	384	100.00
Returned	263	68.49
Unreturned	121	31.51

258 **Source:** Field Survey (2019)

259 Table 1 indicates that 384 questionnaires (100%) were administered; 263 questionnaires  
260 (68.49%) were returned while 121 questionnaires (31.51%) were not returned. Based on the  
261 result, the study analyzed data on the returned questionnaires.

262 **Table 2 Showing demographic characteristics**

Gender	Frequency	Percent
Male	149	56.7
Female	114	43.3
<b>Total</b>	<b>263</b>	<b>100.0</b>
Age	Frequency	Percent
Below 20 Years	21	8.0

21-25 Years	19	7.2
26- 30 Years	76	28.9
30-35 Years	55	20.9
36- 40 Years	36	13.7
40- 50 Years	27	10.3
Above 50 Years	29	11.0
<b>Total</b>	<b>263</b>	<b>100.0</b>
<b>Certificates</b>	<b>Frequency</b>	<b>Percent</b>
Primary	30	11.4
Secondary	49	18.6
College of Education	96	36.5
University	88	33.5
<b>Total</b>	<b>263</b>	<b>100.0</b>
<b>Business Experience</b>	<b>Frequency</b>	<b>Percent</b>
Below 1 Year	20	7.6
1-2 Years	31	11.8
2-4 Years	88	33.5
4-6 Years	75	28.5
6-10 Years	20	7.6
10-15 Years	20	7.6
Above 15 Years	9	3.4
<b>Total</b>	<b>263</b>	<b>100.0</b>

263 **Source:** field survey, 2019

264 Table 2 above shows the gender of respondents. It is observed that 149 respondents (56.7%)  
 265 were male; and 114 respondents (43.3%) were female. The implication of this is that majority  
 266 of respondents in the study area were male.

267 Table 2 above shows the level of education of respondents. It is posited that 30 respondents  
 268 (11.4%) were Primary School Certificate holder; 49 respondents (18.6%) were Secondary  
 269 School Certificate Holder; 96 respondents (36.5%) were College of Education Certificate  
 270 Holder; and 88 respondents (33.5%) were Bachelor of Science Certificate Holder. It is opined  
 271 that majority of respondents in the study area were College of Education Certificate Holder.

272 The table 2 above shows the age bracket of respondents. It is observed that 21 respondents  
 273 (8.0%) were below 20 years; 19 respondents (7.2%) were within 21-25 Years; 76 respondents  
 274 (28.9%) were within 26- 30 Years; 55 respondents (20.9%) were within 30-35 Years; 36  
 275 respondents (13.7%) were with 36- 40 Years; 27 respondents (10.3%) were within 40- 50  
 276 Years; and 29 respondents (11.0%) were above 50 years. This denotes that the majority of  
 277 respondents in the study area were within 26- 30 Years.

278 Table 2 above shows years involved in business. It is studied that 20 respondents (7.6%) were  
 279 below 1 year; 31 respondents (11.8%) were 1-2 Years; 88 respondents (33.5%) were 2-4  
 280 Years; 75 respondents (28.5%) were 4-6 Years; 20 respondents (7.6%) were 6-10 Years; 20  
 281 respondents (7.6%) were 10-15 Years; and 9 respondents (3.4%) were above 15 years. It is  
 282 observed that majority of respondents in the study area were 2-4 Years.

283 **Table 3: Multiple regression analysis of the effect of Material Planning, Under-stocking**  
 284 **and Over-stocking**

Variables	Column I Profitability			Column II Customers' Satisfaction		
	Coef	t-stat	P-Value	Coef	t-stat	P-Value
Material Planning	.480	28.505	.001	-.064	.255	.775
Under-Stocking	-.160	7.064	.001	-.275	3.872	.022
Over-Stocking	.376	16.795	.001	-.436	.923	.338
Multiple R	.772			.628		
R – squared	.595			.394		
Adjusted R-Squared	.583			.382		
F-Statistics	46.739			33.385		
P-value	.001			.001		

285 **Dependent Variable:** Profitability and Customers' Satisfaction of SMEs

286 **Predictors:** Material Planning, Under-stocking and Over-stocking

287

288 The Multiple R (0.772) in table 3(I) indicate strong linear relationship between the variables.  
 289 The coefficient of determination ( $R^2 = 0.595$ ) show the spread of data on the regression line.  
 290 The R-square indicates that 59.5% variation in the profitability of SMEs is explained by the  
 291 predictor variables (such as material planning, under-stocking and over-stocking of  
 292 materials). The remaining 40.5% shows that there are other variables that account for  
 293 variations in the profitability of SMEs in Kogi State.

294 Table 3(I) shows the levels of variability within a regression model and forms the basis for  
295 tests of significance. The *P*-value for the *F* test statistic ( $F= 46.739$ ) is 0.001, providing  
296 strong evidence against the null hypothesis. The squared multiple correlation  $R^2 = SSM/SST$   
297  $= 156.613/263.000 = 0.772$ , indicating that 77.2% of the variability in "profitability" variable  
298 is explained by "material planning, under-stocking and over-stocking of materials" variables.

299 Table 3(I) shows the relationships between each of the independent variables and profitability  
300 of SMEs in Kogi State. The material planning in the regression model is 0.480 with the *p*-  
301 value less than 0.001. This coefficient represents the mean increase in profitability for every  
302 additional material planning activity. Thus, 48.0% increase in profitability of SMEs in Kogi  
303 State is as a result of the significantly proportional change in material planning activity.  
304 Under-Stocking in the regression model is -0.160 with the *p*-value less than 0.001. On the  
305 contrary, the coefficient represents that the mean decrease in profitability is significantly  
306 caused persisting under-stocking of materials. Unaddressed increase in under-stocking is  
307 likely to significantly cause dwindling profitability in almost the same proportion. The over-  
308 stocking in the regression model is 0.376 with the *p*-value less than 0.001. This coefficient  
309 represents that the mean increase in profitability is significantly brought about by every  
310 increase in over-stocking of materials. Thus, 37.6% increase in profitability of SMEs in Kogi  
311 State is as a result of the significantly proportional increase in over-stocking of materials.

312 The Multiple Coefficient of Determination ( $R= 0.772$ ) in table 3(II) indicates strong linear  
313 relationship between the variables. The coefficient of determination ( $R^2= 0.394$ ) shows the  
314 spread of data on the regression line. The R-square indicates that 39.4% variation in the  
315 customer's satisfaction of SMEs is explained by the predictor variables (such as material  
316 planning, under-stocking and over-stocking of materials). The remaining 60.6% shows that  
317 there are other variables that account for variations in the customer's satisfaction of SMEs in  
318 Kogi State. The *P*-value for the *F* test statistic ( $F= 33.385$ ) is less than 0.001, providing  
319 strong evidence against the null hypothesis. The squared multiple correlation  $R^2 = SSM/SST$   
320  $= 103.559/263.000 = 0.394$ , indicating that 39.4% of the variability in "customer's  
321 satisfaction of SMEs" is explained by "material planning, under-stocking and over-stocking  
322 of materials" variables.

323 Table 3(II) shows the relationships between each of the independent variables and customer's  
324 satisfaction of SMEs in Kogi State. The material planning in the regression model is -0.064  
325 with the *p*-value more than 0.05. This coefficient represents the mean increase in customer's  
326 satisfaction for every decrease in material planning activity. Interestingly, 48.0% increase in

327 customer's satisfaction of SMEs in Kogi State is not significantly brought about by  
 328 proportional decrease in material planning activity. Under-Stocking in the regression model is  
 329 -0.275 with the p-value less than 0.05. Also, the coefficient represents the mean decrease in  
 330 customer's satisfaction of SMEs for every persisting under-stocking of materials.  
 331 Unaddressed increase in under-stocking significantly causes customer's satisfaction of SMEs  
 332 in Kogi State to decrease in almost the same proportion. The over-stocking in the regression  
 333 model is -0.436. This coefficient represents the mean increase in customer's satisfaction of  
 334 SMEs for every decrease in over-stocking of materials. Interestingly, 37.6% increase in  
 335 customer's satisfaction of SMEs in Kogi State is as a result of the proportional decrease in  
 336 over-stocking of materials; but this appears to be insignificant.

337 **Table 4: Probit regression result of factors affecting profitability**

Variables	Coefficients	Standard Error	P> z
X <sub>1</sub> Increasing Purchasing Cost	.234	.113	.000*
X <sub>2</sub> Increased Marketing Cost	-.541	.259	.014*
X <sub>3</sub> Obsolescence Due To Over-Stocking	-.179	.041	.000*
X <sub>4</sub> Wastages Due To Over-Stocking	-.507	.270	.031*
X <sub>5</sub> Loss Of Customer's Patronage	.063	.065	.384

338 **Source:** Field Survey, 2019

339 *Number of Obs* = 263  
 340 *PR chi<sup>2</sup>* = 189.244  
 341 *Prob > chi<sup>2</sup>* = 0.000  
 342 *R<sup>2</sup> (Probit)* = 0.419

343 **NB:** Figures in the column of z-values\* symbolize significance respectively.

344 The Table 4 shows the factors affecting the profitability of SMEs in Kogi State. The factors  
 345 are increasing purchasing cost, increased marketing cost, obsolescence due to over-stocking,  
 346 wastages due to over-stocking and loss of customer's patronage.

347 From the result of the Ordered Probit Regression on the table 4, the PR chi<sup>2</sup> is 189.244. The  
 348 Pearson goodness-of-fit chi-square statistic tests the null hypothesis that the model  
 349 adequately fits the data. The significance value of the test is small (less than 0.05 or equal to  
 350 0.01); therefore, the model does adequately fit the data. It is thus appropriate to say that the  
 351 data do not violate the model assumptions. Prob > chi<sup>2</sup> = 0.000 which implies that 100% of  
 352 the changes in the profitability of SMEs were explained by the variables in the model. The R<sup>2</sup>  
 353 (Probit) of 0.419 shows that about 41.9% of the profitability of SMEs is explained by the  
 354 significant factors (increasing purchasing cost, increased marketing cost, obsolescence due to

355 over-stocking and wastages due to over-stocking). The implication of this is that factors (such  
356 as increasing purchasing cost, increased marketing cost, obsolescence due to over-stocking  
357 and wastages due to over-stocking) affect the profitability of SMEs significantly among  
358 others. It is observed that ‘increased marketing cost, obsolescence due to over-stocking,  
359 wastages due to over-stocking’ entered the model with a negative sign, which implies that  
360 change in these factors would lead to a probabilistic inverse change in the profitability of  
361 SMEs in Kogi State. Only ‘increasing purchasing cost’ positively relate with the profitability  
362 of SMEs in Kogi State. Importantly, factor (such as loss of customer’s patronage) appear to  
363 be insignificantly related to the profitability of SMEs in Kogi State.

364

## 365 5. DISCUSSION OF FINDING

366 Finding shows that majority of SMEs witness under-stocking and over-stocking of materials.  
367 There is likelihood that SME owners have weaknesses relating to materials planning. It is  
368 discovered that under-stocking and over-stocking of materials are inevitable in the operation  
369 of SMEs. There are seen to have implications on the profitability rate of their enterprise.  
370 SME owners appear to have stable and satisfactory profitability. Empirical investigation  
371 proves that 59.5% variation in the profitability of SMEs is explained by material planning,  
372 under-stocking and over-stocking of materials. It was found that material planning and over-  
373 stocking of materials have significantly positive on profitability of SMEs in Kogi State.  
374 Under-Stocking is discovered to have significantly negative on profitability of SMEs in Kogi  
375 State. The studies of Ondiek (2009) and Miller (2010) are in agreement with the finding of  
376 this study. Meanwhile, the finding of this present study provides clearer understanding of  
377 specific constructs (material planning, under-stocking and over-stocking of materials) as they  
378 reflect on profitability of SMEs in Kogi State. The finding of Ibegbulem and Okorie (2015)  
379 and Nwosu (2014) provided a holistic empirical backing that material planning, under-  
380 stocking and over-stocking of materials as core parts of material management significantly  
381 contribute to the profitability of organizations.

382 It was discovered that SME owners have achieved moderate customer’s satisfaction.  
383 Customer’s often get what they need in good shape and in line with their value. Empirical  
384 investigation shows that 39.4% variation in the customer’s satisfaction of SMEs is explained  
385 by material planning, under-stocking and over-stocking of materials. Empirical evidence  
386 shows that persistent material under-stocking significantly causes customer’s satisfaction of

387 SMEs in Kogi State to decrease. Material planning and over-stocking appear insignificant to  
388 influence customer's satisfaction of SMEs in Kogi State. This finding aligns with that of  
389 Planert (1999) that material resources planning do not significantly affect customer's  
390 satisfaction. Kim (2014) opined that material resources planning can only predict customer's  
391 dynamic behavior. With respect to the effect of materials under-stocking, Ewuola, Imoundo,  
392 Ajibefun, daramola and Ayodeji (2005) buttressed that avoiding issues of under stocking  
393 ultimately guarantee customer satisfaction.

394 It is found that there are several costs associated with poor material planning. Descriptive  
395 analysis shows that increasing purchasing cost, increased marketing cost, obsolescence due to  
396 over-stocking, wastages due to over-stocking, loss of customer's patronage and production  
397 breakdown due to under-stocking associate with poor material management of Small and  
398 Medium enterprises. Empirically, 'increased marketing cost, obsolescence due to over-  
399 stocking and wastages due to over-stocking' negatively and significantly affect the  
400 profitability of SMEs in Kogi State. It is found that only 'increasing purchasing cost'  
401 positively and significantly relate with the profitability of SMEs in Kogi State. Empirical  
402 investigation proofs that 'loss of customer's patronage' is insignificantly related to the  
403 profitability of SMEs in Kogi State.

## 404 **6. CONCLUSION**

405 Materials management is critical to the achievement of desired performance of SMEs.  
406 Considering some aspects of materials management, material planning, under-stocking and  
407 over-stocking of materials have varying predicting power over varying dimensions of the  
408 performance of SMEs. Though, material planning, under-stocking and over-stocking of  
409 materials are practices of SME owners in their routine operation, but their implications are  
410 different.

411 Based on the finding of the study, material planning and over-stocking of materials have  
412 significantly positive implication on the profitability of SMEs in Kogi State. proper materials  
413 planning has the propensity to influence profitability of SMEs. Also, over-stocking of  
414 materials is seen to have short-run positive implication on the profitability of SMEs in Kogi  
415 State. Under-Stocking of materials has significantly negative implication on the profitability  
416 of SMEs in Kogi State. Factually, under-stocking of materials may cause production short-  
417 down, and there may be gap in supply and meeting of customers' demand at the short-run.

418 This may make customers' to find alternative or substitute for their demanded products. The  
419 consequence of this is that profitability of SMEs suffers a setback. The empirical evidence  
420 provided by this study shows that persisting materials under-stocking will bring about  
421 decreasing customer's satisfaction of SMEs in Kogi State. Material planning and over-  
422 stocking have not been found instrumental to the increasing customer's satisfaction of SMEs  
423 in Kogi State. Avoiding issues of materials under stocking will help to enhance customer  
424 satisfaction.

425 However, increased marketing cost, obsolescence due to over-stocking and wastages due to  
426 over-stocking have been found to negatively and significantly affect the profitability of SMEs  
427 in Kogi State. In the case of 'increasing purchasing cost', profitability of SMEs is seen to  
428 have direct relationship. The profitability of SMEs in Kogi State is in no way influenced by  
429 'loss of customer's patronage'.

430 The study's population was supposed to be considered infinite because the Ministry of  
431 Commerce has no concrete data record. There are many SMEs that are not registered and  
432 may not want to participate in the research for the fear of being exposed. The researcher thus  
433 addressed this by promising anonymity. In the course of the study, there are some findings  
434 which appear contrary to the a-priori expectation. Thus, the following are suggested for  
435 future study to provide some clarifications:

- 436 i. The long-run implication of over-stocking of materials on the profitability rate of  
437 SMEs in Kogi State should be investigated.
- 438 ii. Material resources planning as a viable tool and proactive means to withstand  
439 customers dynamic behavior needs to be examined.
- 440 iii. The effect of increasing purchasing cost on the profitability of SMEs in Kogi State  
441 should be investigated.
- 442 iv. The relationship between loss of customer's patronage and the profitability of SMEs  
443 in Kogi State should be ascertained.

444

## 445 **7. RECOMMENDATIONS**

446 With respect to the findings of the study, the following recommendations are made that:

- 447 i. SME owners should engage in effective material planning and also keep over-  
448 stocking of materials moderate. Over-stocking is evidently proven to be more



449 favourable to under-Stocking. Under-Stocking of materials should be discouraged; as  
450 all these will boost profitability of SMEs in Kogi State if properly adhere to.

451 ii. SME owners should avoid persistent material under-stocking to enhance customer's  
452 satisfaction in Kogi State. Material planning and over-stocking should be given less  
453 attention if customer's satisfaction of SMEs in Kogi State will be achieved.

454 iii. SME owners should reduce marketing cost, minimize obsolescence due to over-  
455 stocking and minimize wastages due to over-stocking to achieve increased  
456 profitability in Kogi State. In addition, SME owners should purchase more materials  
457 as this has positive effect on profitability of their enterprises in Kogi State.

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