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Prediction of Profit Lost to Underutilization during Useful Life of Manufacturing Systems

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Abstract

Rapluc-Comparator used for predicting and comparing future worth of profit that will be lost to underutilization during the useful life of production equipment and their replacement costs was developed in this study and used to evaluate the equipment replacement potentials of some manufacturing industries in Nigerian. Results obtained showed that 21.52% of the industries investigated (mainly small and medium scale firms) will lose profit worth more than their equipment replacement cost to underutilization at the end of their systems while 35.14% of them will lose profit worth over 50% of their equipment replacement cost. This revealed that capacity planning which amply accounts for both input availability and product demand before design and procurement of production facilities is inadequate in the small and medium scale manufacturing sector of this nation. Hence, the significant effect of unused capacity charges on selling price of products of small firms relative to those of the large ones in Nigeria and incessant liquidation of Nigerian small and medium manufacturing industries due to the inability of the firms to replace their production facilities as at when due because of huge profit lost to underutilization. Rapluc-Comparator is therefore recommended to owner/managers of industries for self-assessment of their potentials for continuous existence and robustness in stiff market competition.

Keywords: Capacity, manufacturing system, profit lost, replacement cost, underutilization

1.0 Introduction

Capacity utilization of manufacturing sector has been a crucial economic issue in developing countries over the years due to the leading position of this sector in promoting productivity, investment, import substitution, export expansion, employment and per capita income of any nation at a faster rate than any other sector (Ogwuma, 1995; Shebeb, 2002). In addition, manufacturing sector provides wider and more efficient linkage among different sectors (Ogwuma, 1995). Capacity utilization is a measure of the extent to which an enterprise or a nation uses its installed productive capacity (Hosen et al, 2011). Technically, capacity utilization is the average ratio of the actual output of a firm to the maximum that could be produced with her existing plant and equipment (Johansson, 1988) while for an economist, it measures the ratio of actual output to the level of output, beyond which the average cost of production begins to rise (Berndt and Morrison, 1981). However, Hosen et al (2011), revealed that even though the typical engineering idea of capacity differs from the economist's definition because what is technically possible may not be economically desirable, time series analysis showed that both views stress the same fact (output versus input) over time. This view of Hosen et al (2011), is correct because with adequate capacity planning which account for optimal production level with respect to input availability and product demand before design and procurement of facilities in a firm, the differences between the available economic and engineering capacities is insignificant. Thus, irrespective of the perspective one is viewing it, capacity utilization remained the ratio of used capacity to the available one. The difference between the used and available capacities is referred as excess or underutilized capacity.

All entrepreneurs/companies desire hundred percent capacity utilization but records showed that none operates at this rate because of downtime due to equipment malfunctions and various other causes (James, 2002; Anwar and Moudud, 2004; Susan and Roger, 2004; Chijioke, 2010). A consistent rate of about 85 percent utilization of installed productive capacity is considered optimal in most industries. Records revealed average capacity utilization rate of United States firms as 79.5%, Japan 83–86%, European Union 82%, Australia 80%, Brazil 60–80%, India 70%, China perhaps 60%, Turkey 79.8%, Canada 87% while that of Nigeria is very low (30 - 40%) despite high demand of manufactured goods in this nation (Anwar and Moudud, 2004; Dauda, 2006; Akindele, 2014). Hence, a lot of wastes of meager production capacities available in this country. This ugly phenomenon is more pronounced in many indigenous owned/managed production firms in Nigeria. Thus, the ever increasing rate of liquidation of small and medium scale industries as well as many indigenous large scale production firms in this country despite several policy initiatives and resources government is injecting in this

(1)

(2)

sector to facilitate the process of industrialization in the country. Many attributed this national menace to lack of technological know-how, shortfall in utility and inadequate government policies (Ukoha, 2000; Olorunsola, 2002; Dauda, 2006; Akindele, 2014). However, Chijioke (2010), revealed the inability of the liquidated firms to replace their production equipment/machineries after their useful life as the major cause of the high rate of their liquidation. This work stressed that Nigerian entrepreneurs are not sensitive to the adverse effect of huge profit they sacrifice daily to underutilized capacities on the stability and continuous existence of their firms in a stiff market competitive condition. Chijioke (2010), then recommended that this attitude must be controlled before other measures toward sustainable manufacturing sector will yield the desired result in this country. Therefore, it is economically necessary to develop a model that will be used in predicting and comparing the total profit that will be lost to unused capacity of any manufacturing system after its salvage period with its replacement cost at any given time and production rate. Comparison of these two parameters is necessary to enable operators of manufacturing systems know the ratio of the money required for their system replacement which will be lost due to excess or unused capacity. In other words the prediction and comparison of the two parameters is a measurement of the monetary worth of unused systems capacities relative to their replacement costs and will be a tool for forecasting equipment replacement potentials of industries at any given production rate and time. Although, many model and approaches for capacity utilization measurement have being developed and used over the years by Rasche and Tatom (1977), Berndt and Morrison (1981), Corrado and Mattey (1997), Omer (1998), Kim (1999), Anwar and Moudud (2004), Ray and Kankana (2005) and Hosen et al (2011) and many others, none of the tools developed/used in previous works quantified the losses associated with underutilized capacity of a system relative to its replacement cost. This is why atimes it is difficult to relate the losses to a tangible quantity which the investors in this sector will understand. Thus, the objective of this study is to develop a prediction tool that will used in evaluating the total profit that will be lost to underutilization during the useful life of manufacturing systems.

2.0 Model Development and Evaluation Procedure

The model of the profit lost to underutilization of a production system during its salvage period was derived from basic economic/mathematical concept which expresses profit, P_f as the difference between total sales, SP and production cost, CP (Equation 1).

$$P_f = SP - CF$$

Production cost is the total cost of materials, wages, depreciation and other production disbursements such as transportation cost, selling cost, maintenance cost etc. Therefore, profit per unit product, P_u constitutes the difference between the selling price per unit, S and production cost per unit (Equation 2);

$$P_u = S - \left(\frac{M + W + D + O}{A}\right)$$

Where M, W, D and O constitutes annual cost of raw materials, wages, depreciation and other disbursements respectively while A is the actual production rate of the system in any given year. Annual depreciation which measures the cost of deterioration in the value of a production system or the cost of having the system during any year under review was determined using straight depreciation method given by Onwualu et al (2002) as;

$$D = \frac{(Z - F)}{N} \tag{3}$$

Where Z, F and N are the initial cost, salvage value and salvage period of the system respectively. Initial cost constitutes total amount spent in the procurement, installation and commissioning of the production equipment/system. The total profit lost due to unused capacity of a manufacturing system in any year, P_L is the product of the profit per unit item sold and number of items that should have been produced but are not because the system is not fully utilized (underutilized capacity). Recall underutilized capacity of any system is the difference between its installed and actual production rate. Thus, the total profit lost to unused capacity of a manufacturing system in any given year is expressed mathematically as follows;

$$P_L = P_u(C - A) \tag{4}$$

Where C is the installed capacity of the systems per year, which is the number of products the system was installed to produce in a year. Hence, the future worth of the total profit lost, P to unused capacity at the end of the salvage period of any production equipment was determined from Equation (4) using compound interest approach;

$$P = P_L (1+i)^{\mathsf{N}} \tag{5}$$

Where *i* is the interest rate prevailing in the economy. Substituting Equations (2), (3) and (4) into Equation (5) gives the future worth of the profit lost to underutilization during the salvage period of any production system as;

$$P = \left(S - \frac{N[M+W+0] + [F-Z]}{AN}\right)(C - A)(1+i)^{N}$$
(6)

Equation (6) is suitable for prediction when the annual production rate, selling price, cost of raw materials, wages, depreciation and other production disbursements remained constant over the salvage period of the manufacturing system. However, this is rarely possible in practice, in order to reduce the effect of variations in

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the values of these parameters over the productive life span of the system, their mean values for a given test period (k > 1 year) should be used for the prediction instead of production data of one year. Hence, accounting for the fluctuation in these production parameters from year to year gives the future worth of the profit that will be lost to underutilization of any production system as;

$$P = \frac{1}{k} \sum_{k=1}^{k} \left(S - \frac{N[M+W+O] + [F-Z]}{AN} \right) (C - A) (1 + i)^{N}$$
(7)

The future worth of the replacement cost, R of a production system at the end of it salvage period was deduced from capital recovery model of Onwulu et al (2002) as;

$$R = Z(1 + i)^{N} - l$$

(8)

Therefore, the percentage ratio, T of the profit lost to underutilization of a manufacturing system to its replacement cost was determined as;

$$T = \frac{100[1+i]^N}{kZ[1+i]^N - kF} \sum_{k=1}^k \left[\left(S - \frac{N[M+W+O] + [F-Z]}{AN} \right) (C-A) \right]$$
(9)

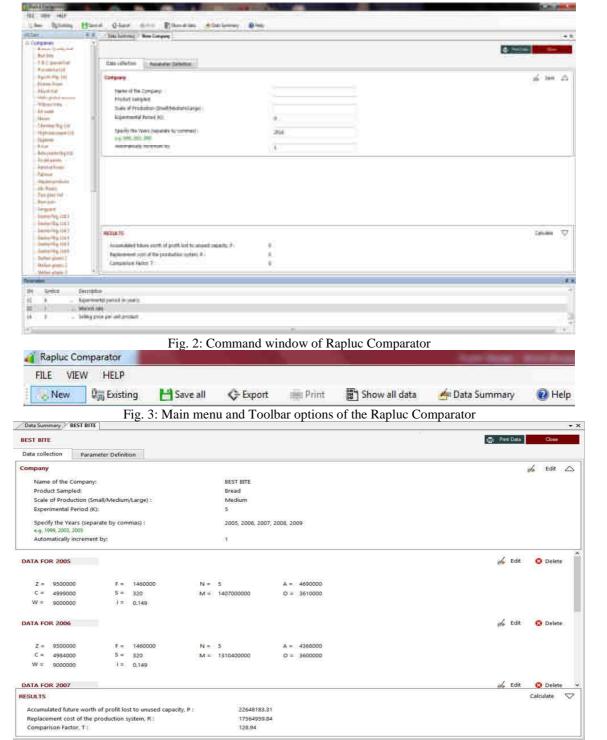
In order to sidestep lengthy and error-prone manual computations in the use of these models (Equation 7, 8 and 9) and to make their application user friendly, an easy to comprehend object oriented C# dot net. program, *Rapluc Comparator* was also developed for their implementation. This software was designed with an embedded installation set up that installs all its pre-requisite files including the .chm help files offline as a single install pack. System configuration required for this software includes Windows 2000 or higher; 512MB of RAM; 800MB of free disk space; 1024x768 screen resolution or higher and Microsoft.NET framework version 4.0 (64or 32 bits). Its installation involves double clicking on the CD/DVD drive icon on "My Computer" to open the software CD named "*Rapluc Comparator*" before a double click on the folder named "*Rapluc Comparator* setup" to run the setup file inside the folder following the prompts to install the software.

Launching of Rapluc Comparator after its installation requires a double click on its HelpNDoc 3 shortcut icon on the desktop (Fig. 1) or click the same on the window start menu to feature the command window of the software (Fig. 2). The command window serves as the main program interface by which operations are performed using its main menu and tool bar. The main menu (Fig. 3) has three major options-"FILE", "VIEW" and "HELP". A click on the "FILE" menu displays five different sub-options, "New", "Existing", "Export to Excel", "Print" and "Exit". A click on "New" opens a window (Fig. 2) for creating a new test record; type in your data in the appropriate text boxes as per each test period or year before a click on "save" to save the inputs and thereafter click on "calculate" to generate the predicted values of P, R and T which will be displayed under the "Result" section of the window (Fig. 4). The "Existing" option is used to display the tests sidebar if it is not visible. The side bar shows the list of all the previous tests saved in this program. The "Export to Excel" option allows for exportation of table of data (inputs and predictions) from this application to Microsoft Excel while "Print" is used for printing of works performed directly. "Exit" closes the application. The "VIEW" menu is used to display and hide the Toolbar, Parameter definition and Tests sidebar. The "Toolbar" gives quick access to useful functions like New, Existing, Save, Export, Print, Show all data, Data Summary and Help. "Show all data" button shows the parameters values during all experimental periods for all tests recorded with the predicted values of P, R and T while "Data Summary" button shows a table of data for all saved tests (Fig. 5). The "HELP" menu shows two options; "About" and "Help". The "Help" shows the help file while "About" displays information about the software.

The production data used in the assessment of profit lost to underutilization with this software were obtained using questionnaire approach complemented with physical verification of the data through field visits to thirty-seven manufacturing firms in Nigeria between May and December, 2013. The questionnaire was structured so as to assess all the parameters of the models while the interest rate used in this study is the prevailing mean interest rate of 14.9% in Nigeria during this period.



Fig. 1: Rapluc Comparators HelpNDoc 3 shortcut on the desktop



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Fig. 4: Predictions of P, R and T for BEST BITE Company



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Fig. 5: Summary of inputs and predictions generated by the Rapluc Comparator

3.0 Result and Discussion

The Rapluc-Comparator predictions of the profit lost to underutilization, replacement cost and the comparative ratio of these two parameters made from the production data of the thirty-seven Nigerian manufacturing companies investigated are shown in Table 1. This table shows that 21.52% of the industries will lose profit worth more than their equipment replacement cost to underutilization at the end of their systems' useful life while 35. 14% of them will lose profit worth over 50% of their equipment replacement cost. This revealed that capacity planning which amply accounts for both input availability and product demand before design/procurement of production equipment is lacking in the small and medium scale manufacturing sector of this nation. Hence, the high cost of goods from these sectors relative to large scale sector resulting from shifting the cost of unused capacity to consumers, thereby placing the firms in a tight corner in a prevailing competitive economy. The results also revealed high rate of liquidation of manufacturing industries in this nation as a result of the inability of the firms to replace their production facilities as and when due because of huge profit lost to underutilization during the useful life of their facilities.

Table 1: Comparative	Analysis of	f the l	Profit	Lost to	Underutilization	and	Replacement	Costs o	f Production
Systems									

| Company_Name | P_(#I) | R(M) | 1(%) | Year (k = 5) | O(94)
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 | <(₩) | I (M)
 | N(yeara) | i(%) | S(00) | P/year(₩)
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 | 1800000
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 | 1.00 | 0.142 | 200 | 3339085.73
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 | 1850000 | 514000
 | 1.00 | 0.142 | 200 | 350053.33
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 | 1850000 | 514000
 | 1.00 | 0.149 | 200 | 2559548.61
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Agach Night Hill 1841543 178760130 2538 | Hansen Goding Hand ADB (MASS: 4377160A) 171.01 2000 Drin Globin Road Alie 2001 2001 2001 Drin Globin Road Alie 2001 2001 2001 Head Rife Lincais Hall 2002 (2001) 1.0607493.00 2001 2001 Head Rife Lincais Hall 2002 (2001) 1.0607493.00 1004 2001 2001 Note 2003 (2001) 1.0607493.00 1004 2001 2001 Note 2001 2001 2001 2001 2001 V & Coperand Lind KMARTA (2001) 49641063.01 1005.06 2001 2001 Glob Lincashna 2002 (2001) 49641063.01 2003 2001 Glob Lincashna 2002 (2001) 49640063.01 2003 2001 Fronderine Ventures 2807 (2002) 960,0163.01 2003 2001 2001 King, Irmited 2001 2001 2001 2001 2001 Note, Irmited 2001 2003 2004 2001 2001 Agachi reg, Irdi </td <td>Hansen Godiny Isad AURONISS AURONISS AURONISS AURONISS Die Globie Road Alie JUN AURONIS AURONIS Die Globie Road Alie JUN AURONIS AURONIS Den Globie Road Alie JUN AURONIS AURONIS Head Ride Locals Hild ZASSZURAT 1 ANAVANIK JUN AURONIS Part Head Intel Locals Hild ZASSZURAT 1 ANAVANIK JUN AURONIS Part Headard I, Brees ZURY JUN AURONIS Note JUN AURONIS AURONIS Note JUN JUN AURONIS V & Caperad Loaf MAUTA/UL/191 MAURONIS JUN AURONIS Glob Lona Anama JUN JUN JUN JUN JUN Glob Lona Anama JUN JUN JUN JUN<</td> <td>Hansen Guelity ford AND 24,55 437/162,47 1/1,10 2008 400000 150000 Driftlood Mie 2009 400000 150000 150000 Driftlood Mie 2009 400000 150000 150000 Heat Mie 2009 400000 150000 150000 Part Mie Londs Hild 2002 400000 150000 150000 Part Internant I, Brees 2009 360000 500000 500000 Note 2009 360000 500000 500000 500000 Note 2009 360000 500000 500000 500000 Note 2001 360000 500000 122000 500000 Note 2001 360000 122000 500000 122000 Soft Norm Asemae 2009 360000 122000 500000 Gold Unnashoe 2007 360000 122000 500000 Normeesteed 2007 20000 520000 520000 Gold Unnashoe</td> <td>Hansen Guelity foel AND 24,55 AD7/160,17 1/1,00 2006 400000 130000 2306000 20 r Clobin fload Ais 2019 400000 130000 230000 230000 20 r Clobin fload Ais 2010 400000 130000 230000 230000 1000 130000 130000 130000 3014000 3014000 1001 420000 130000 3014000 3014000 3014000 1001 100101 2255220012 126970 360000 9000001 30140000 Part-Inercoard, Boses 2017 360000 9000001 10240000 1000001 102400000 Note 2017 360000 9000001 10240000 10240000 10240000 10240000 10240000 9000001 12240000 9260001 12240000 9260001 12240000 9260001 12240000 9260001 12240000 9260001 12240000 9260001 1224000 9260001 12240000 9260001 12240000 9260001 12240000<</td> <td>Hansen Guelity Los / AZILVALSE 4377/100.07 171.01 2008 4002000 1400000<!--</td--><td>Hansen Chelity I and A XH12A,NS A XH71BGAA7 171.01 2008 4002000 1 MIGRED 3 MIGRED <th3 migred<="" th=""> 3 MIGRED <th3 migred<="" td="" th<=""><td>Hansen Guehry and ANDIONAS 4377/hbbn/ 171.01 2001 4000300 180000 30188120 240240 120100 100100 30188120 240240 120100 120100 200240 200240 200100 200240 200100 <</td><td>Hansen Guelity Ised ADD/ALSS ADD/ALSS<!--</td--><td>Tensor Clock by Lod AUTONANA TATAD AURO AURONAN TAUDONAN STADADA STADA</td><td>Harvan Caselity (ad. / SAUCALS 437/180.// 171.01 2001 400300 140000 340800</td><td>Itenses Junese <thjunese< th=""> <thjunese< th=""> <thjunese< t<="" td=""></thjunese<></thjunese<></thjunese<></td></td></th3></th3></td></td> | Hansen Godiny Isad AURONISS AURONISS AURONISS AURONISS Die Globie Road Alie JUN AURONIS AURONIS Die Globie Road Alie JUN AURONIS AURONIS Den Globie Road Alie JUN AURONIS AURONIS Head Ride Locals Hild ZASSZURAT 1 ANAVANIK JUN AURONIS Part Head Intel Locals Hild ZASSZURAT 1 ANAVANIK JUN AURONIS Part Headard I, Brees ZURY JUN AURONIS Note JUN AURONIS AURONIS Note JUN JUN AURONIS V & Caperad Loaf MAUTA/UL/191 MAURONIS JUN AURONIS Glob Lona Anama JUN JUN JUN JUN JUN Glob Lona Anama JUN JUN JUN JUN< | Hansen Guelity ford AND 24,55 437/162,47 1/1,10 2008 400000 150000 Driftlood Mie 2009 400000 150000 150000 Driftlood Mie 2009 400000 150000 150000 Heat Mie 2009 400000 150000 150000 Part Mie Londs Hild 2002 400000 150000 150000 Part Internant I, Brees 2009 360000 500000 500000 Note 2009 360000 500000 500000 500000 Note 2009 360000 500000 500000 500000 Note 2001 360000 500000 122000 500000 Note 2001 360000 122000 500000 122000 Soft Norm Asemae 2009 360000 122000 500000 Gold Unnashoe 2007 360000 122000 500000 Normeesteed 2007 20000 520000 520000 Gold Unnashoe | Hansen Guelity foel AND 24,55 AD7/160,17 1/1,00 2006 400000 130000 2306000 20 r Clobin fload Ais 2019 400000 130000 230000 230000 20 r Clobin fload Ais 2010 400000 130000 230000 230000 1000 130000 130000 130000 3014000 3014000 1001 420000 130000 3014000 3014000 3014000 1001 100101 2255220012 126970 360000 9000001 30140000 Part-Inercoard, Boses 2017 360000 9000001 10240000 1000001 102400000 Note 2017 360000 9000001 10240000 10240000 10240000 10240000 10240000 9000001 12240000 9260001 12240000 9260001 12240000 9260001 12240000 9260001 12240000 9260001 12240000 9260001 1224000 9260001 12240000 9260001 12240000 9260001 12240000< | Hansen Guelity Los / AZILVALSE 4377/100.07 171.01 2008 4002000 1400000 </td <td>Hansen Chelity I and A XH12A,NS A XH71BGAA7 171.01 2008 4002000 1 MIGRED 3 MIGRED <th3 migred<="" th=""> 3 MIGRED <th3 migred<="" td="" th<=""><td>Hansen Guehry and ANDIONAS 4377/hbbn/ 171.01 2001 4000300 180000 30188120 240240 120100 100100 30188120 240240 120100 120100 200240 200240 200100 200240 200100 <</td><td>Hansen Guelity Ised ADD/ALSS ADD/ALSS<!--</td--><td>Tensor Clock by Lod AUTONANA TATAD AURO AURONAN TAUDONAN STADADA STADA</td><td>Harvan Caselity (ad. / SAUCALS 437/180.// 171.01 2001 400300 140000 340800</td><td>Itenses Junese <thjunese< th=""> <thjunese< th=""> <thjunese< t<="" td=""></thjunese<></thjunese<></thjunese<></td></td></th3></th3></td> | Hansen Chelity I and A XH12A,NS A XH71BGAA7 171.01 2008 4002000 1 MIGRED 3 MIGRED <th3 migred<="" th=""> 3 MIGRED <th3 migred<="" td="" th<=""><td>Hansen Guehry and ANDIONAS 4377/hbbn/ 171.01 2001 4000300 180000 30188120 240240 120100 100100 30188120 240240 120100 120100 200240 200240 200100 200240 200100 <</td><td>Hansen Guelity Ised ADD/ALSS ADD/ALSS<!--</td--><td>Tensor Clock by Lod AUTONANA TATAD AURO AURONAN TAUDONAN STADADA STADA</td><td>Harvan Caselity (ad. / SAUCALS 437/180.// 171.01 2001 400300 140000 340800</td><td>Itenses Junese <thjunese< th=""> <thjunese< th=""> <thjunese< t<="" td=""></thjunese<></thjunese<></thjunese<></td></td></th3></th3> | Hansen Guehry and ANDIONAS 4377/hbbn/ 171.01 2001 4000300 180000 30188120 240240 120100 100100 30188120 240240 120100 120100 200240 200240 200100 200240 200100 < | Hansen Guelity Ised ADD/ALSS ADD/ALSS </td <td>Tensor Clock by Lod AUTONANA TATAD AURO AURONAN TAUDONAN STADADA STADA</td> <td>Harvan Caselity (ad. / SAUCALS 437/180.// 171.01 2001 400300 140000 340800</td> <td>Itenses Junese <thjunese< th=""> <thjunese< th=""> <thjunese< t<="" td=""></thjunese<></thjunese<></thjunese<></td> | Tensor Clock by Lod AUTONANA TATAD AURO AURONAN TAUDONAN STADADA STADA | Harvan Caselity (ad. / SAUCALS 437/180.// 171.01 2001 400300 140000 340800 | Itenses Junese Junese <thjunese< th=""> <thjunese< th=""> <thjunese< t<="" td=""></thjunese<></thjunese<></thjunese<> |

Industrial Engineering Letters ISSN 2224-6096 (Paper) ISSN 2225-0581 (online) Vol.5, No.1, 2015



32	Akuchi FeedMill	19525407.85	55027964.48	35.48	2008	39614800	9360000	579008745	298074	386560	14070000	1400000	10	0.149	2350	15206122.61
33	Company				2009	71939000	9360000	698707538	359695	365280	14070000	1400000	10	0.149	2350	4552992.07
34	Rumuokoro, Port				2010	73745000	9360000	716248313	368725	365280	14070000	1400000	10	0.149	2350	2958031.87
35	Harcourt				2011	76634600	9360000	744313553	383173	365280	14070000	1400000	10	0.149	2350	378766.52
36					2012	75922800	9360000	737400195	379614	386560	14070000	1400000	10	0.149	2350	1246847.11
	dato Global Services	113188,88	1631646.01	6.94	2008	1103795	5400000	1558550	4270000	4392000	1280000	310000	3	0.149	4	248409.19
38	Umited				2009	1115892.8	5400000	1575632	4316500	4377600	1280000	310000	3	0.149	4	124680.87
39	Km 2 Umuahla				2010	1131609.6	5400000	1597824	4377600	4377600	1280000	310000	3	0.149	4	0
40 4 41	Okigwe Expressway				2011 2012	1131609.6 1135332	5400000 5400000	1597824 1608080	4377600 4392000	4377600 4392000	1280000 1280000	310000 310000	3	0.149 0.149	4	0
	VidowsMite Bakeries	601514.94	2743004-02	16.61	2012	1636600	9120000	52371200	327320	367400	1250000	514000	G	0.149	210	659600
43	20 Timber market	021014/04	5742004.05	10.01	2008	1665000	9120000	53280000	333000	306300	1850000	514000	G	0.149	210	564233.33
	ood Abak, Awka Ibom				2010	1831500	9120000	58608000	366300	306300	1850000	514000	Ğ	0.149	210	0
45					2011	1798200	9120000	57542400	359640	306300	1850000	514000	G	0.149	210	126687.65
46					2012	1837000	9120000	58784000	367400	307400	1830000	514000	6	0.149	210	0
47	AV Table water	2664381.27	461257.05	577.63	2008	1683600	6000000	6002400	7320000	9607500	370000	100000	3	0.149	4	4845000
48	Company Limited				2009	2035648	6000000	7525852	8937600	9576000	370000	100000	3	0.149	4	1448280
49	6 Oboro street				2010	2055648	6000000	7525852	8937600	9576000	370000	100000	3	0.149	4	1448280
50	Umuchia				2011	2097600	6000000	7478400	9120000	9576000	370000	100000	3	0.149	- 4	1040700
51					2012	2104500	6000000	7508000	9130000	9120000	370000	100000	3	0.149	4	0
	Nason Bottle Water	3100990.12	18336899.85	16.91	2008	1932480	5400000	37058480	2196000	2928000	14600000	3810000	3	0.149	25	2300791.11
53	Km 6 Abal Umuahla				2009	2034353.6	5400000	39410073.6	2334720	2918400	14600000	3810000	3	0.149	25	1976676.53
54	Expressway				2010	2054553.6	5400000	39410073.6	2334720	2918400	14600000	3810000	3	0.149	25	1976676.53
55					2011	2054553.6	5400000	39410073.6	2334720	2918400	14600000	3810000	3	0.149	25	1976676.53
56	Chambre Mr. 1911		120200		2012	2061312	5400000	39539712	2342400		14600000	3810000	3	0.149	25	1990377.33
57	Chemiap Nig, Ltd	9720410849	12896222232	75.42	2008	6513576	120000000	3256788000	10855960		200000000	5000000	30	0.149	350	179072149.9
58 59	Osisioma LGA Aba				2009 2010	7537629 6487932	120000000	3768814560 3243966000	12562715 10813220		200000000	5000000 5000000	30 30	0.149 0.149	350 350	117039198.3 178149505.1
60					2010	6487932	120000000	3243966000	10813220		200000000	5000000	30	0.149	350	178149505.1
61					2011	75671172	120000000	3783358600	12611862		200000000	5000000	30	0.149	350	101508545.8
62	High class paper	4259465.97	6046300.28	70.45	2008	1801800	2760000	131040000	1092000	1122000	1550000	170000	10	0.149	150	770884.62
63 C	onversion industries				2009	1785960	2760000	129858000	1082400	1118000	1530000	170000	10	0.149	150	913945.14
64	faulks road, Aba				2010	1742400	2760000	126720000	1056000	1118000	1550000	170000	10	0.149	150	1587552.27
65					2011	1782990	2760000	129672000	1080600	1118000	1550000	170000	10	0.149	150	959989.05
66					2012	1782000	2760000	129600000	1080000	1122000	1550000	170000	10	0.149	150	1078000
67	Eaglestar Plastic Ltd	3009851.39	23938706.32	12.57	2008	2844800	22500000	38608000	406400	406400	10000000	2500000	7	0.149	200	0
68	Osisioma LGA Aba				2009	2479400	22500000	33649000	354200	404800	10000000	2500000	7	0.149	200	1591453.06
69					2010	2479400	22500000	33649000	354200	404800	10000000	2500000	7	0.149	200	1591453.06
70					2011	2479400	22500000	33649000	354200	404800	10000000	2500000	7	0.149	200	1591453.06
71					2012	2667000	22500000	36195000	381000	406400	10000000	2500000	7	0.149	200	917771.43
72	B Lux Integrated	1290685.05	1652364.62	78,47	2008	676000	1800000	6760000	6760	8528	900000	150000	5	0.149	2000	1081200
73	Ind. Nig, Limited				2009	780000 790400	1800000	7800000	7800	8528	900000	150000	5	0.149	2000	473200
74 U 75	muahla Aba Express Road, Abla State				2010 2011	696800	1800000	7904000 6968000	7904 0968	8528	900000 900000	150000 150000	5	0.149 0.149	2000	407652.63 967432.84
76	Node, Abra State				2011	806000	1800000	3060000	3060	8528	500000	150000	5	0.149	2000	307974.19
77	Bota Paint Nig Ltd	324571.16	2841324.48	11.42	2008	2857500	7260000	11620500	38100	38100	1300000	150000	G	0.149	650	0
78	Ubekela, Umuehla				2009	2656500	7260000	10803100	35420	37950	1300000	150000	Ğ	0.149	650	150838.1
79	Abla State				2010	2561625	7260000	10417275	34155	37950	1300000	150000	6	0.149	650	196687.04
80					2011	2561625	7260000	10417275	34155	37950	1300000	150000	6	0.149	650	196687.04
81					2012	2561625	7260000	10845800	33560	38100	1300000	150000	6	0.149	650	161064.88
82 1	/icote Chemical Ind.	1606296.27	1952627.35	82.25	2008	1064000	2400000	25840000	15200	30400	1000000	50000	5	0.149	2000	900000
83	Umited				2009	1696800	2400000	41208000	24240	30300	1000000	50000	5	0.149	2000	746300
	23 Old Aba Road, off				2010	1908900	2400000	46339000	27270	30300	1000000	50000	5	0.149	2000	409122.22
	Woll, Port Harcourt				2011	1590750	2400000	38632500	22725	30300	1000000	50000	5	0.149	2000	878916.67
85					2012	1276800	2400000	31008000	18240	30400	1000000	50000	5	0.149	2000	1070133.33
87	Admiral Paints Ltd	271144.41	1080509.41	25.09	2008	0	3000000	5598160	19304	20320	500000	70000	6	0.149	600	121714.39
88	Bridge Flank, First				2009	0	3000000	5429380	18722	20240	500000	70000	6	0.149	600	172877.3
89	Bridge Busstop				2010	0	3000000	5429380	18722	20240	500000	70000	6	0.149	600	172877.3
90	Abookuta way				2011	0	3000000	5869600	20240	20240	300000	70000	6	0.149	600	0
91	Lagos				2012	0	3000000	5598160	19304	20820	500000	70000	6	0.149	600	121714.39
92	Fabman Nig, Ltd	9385249.86	6668403.54	140.74	2008	6100000	3000000	49288000	2440000	2440000	1750000	350000	10	0.149	50	0
93	Aba Owent Road				2009	5700000	3000000	46056000	2280000	2432000	1750000	350000	10	0.149	50	3900266.67
94	Aba				2010	5700000	3000000	46056000	2280000	2432000	1750000	350000	10	0.149	50	3900266.67
95					2011	5700000	3000000	46036000	2280000	2432000	1750000	350000	10	0.149	50	3900266.67
96					2012	6100000	3000000	49288000	2440000	2440000	1750000	350000	10	0.149	50	0
97	Abplast Products Pic	14261831.43	80215584.36	17.78	2008	11453400	30720000	\$1\$10000	654480	654480		2000000	10	0.149	400	0
	lock 6, Flat 12,LSDPC				2009	11415600	30720000	\$1540000	652320	652820			10	0.149	400	0
	Shopping Contro, 12				2010	11415600	30720000	81540000	652320	652320			10	0.149	400	0
	Industrial Avenue,				2011	10054500	30720000	76104000	005832	652820			10	0.149	400	8871731.43
101	llupeju, Lagos.				2012	10089840	30720000	76356000	610848	654480			10	0.149	400	8908811.43
102	And Plastics Pic	2020121-01	85751358.82	4.6	2008	4581300	31200000	163620000	327240	327240			10	0.149	850	0
_		3939352.02	00101000.02	4.0											_	
	Industrial Avenue,				2009	4481680	31200000	160060000	320120	326160			10	0.149	850	1403908.3
104	llupeju, Lagos.				2010	4481680	31200000	160050000	326160	326160			10	0.149	850	0
105					2011	4439400	31200000	158556000	317100	326160			10	0.149	850	2096845.71
106					2012	4496520	31200000	160590000	321180	327240			10	0.149	850	1410688.3
107	Rem (om	20510979.90	19952581.55	102.8	2008	29370000	3000000	122375000	97900	124600		100000	10	0.149	1800	5559545.45
108	3/5 Umuaduru				2009	30352500	3000000	126468750	101175	124250	5000000	100000	10	0.149	1800	4885942.98
109	Road Osisioma, Aba				2010	30352500	3000000	126468750	101175	124250	5000000	100000	10	0.149	1800	4835942.98
110					2011	27690000	3000000	115375000	92300	124250	5000000	100000	10	0.149	1800	6571730.77
111					2012	32040000	3000000	133500000	105800	124600		100000	10	0.149	1800	3768333.33
112	Geoker Nig. Ltd	12762334.87	38311534.36	33.31	2008	1175300	21516000	881475	3876500		4800000	240000	15	0.149	6	3464155.43
113	448/450 Oshodi				2009	1292100	21516000	9090750	6460500		4800000	240000	15	0.149	G	1111214.41
114	Apapa Expessway				2010	1233700	21516000	9252750	6168500	7665000		240000	15	0.149	G	1141340.53
115	Lagos				2011	1255600	21516000	9417000	6278000	7665000		240000	15	0.149	Ğ	1143402.33
116	Factory 1				2012	1189900	21516000	8924250	5949500		4800000	240000	15	0.149	Ğ	1084993.50
													-			



117 118 119	Geoker Nig. Ltd Factory 2	9185239.17	15642065.24	58.72	2008 2009 2010	1200485 1099745 1100905	28200000 28200000 28200000	15658500 14344500 15220500	5219500 4781500 5073500	6570000 6570000 6570000	4000000 4000000 4000000	400000 400000 400000	10 10 10	0.149 0.149 0.149	10 10 10	1758284.65 1425896.91 1707182.84
120					2010	1141720	28200000	14892000	4964000	6570000	4000000	400000	10	0.149	10	1632620
121					2012	1133325	28200000	4782500	4927500	6570000	4000000	400000	10	0.149	10	4933058.33
122	Geoker Nig. Ltd	0	68389293.58	0	2008	7949760	5460000	67572960	39743800	39748800	18000000	3300000	10	0.149	10	0
123	Factory 3				2009	7927920	5460000	67387320	39639600		18000000	3800000	10	0.149	10	0
124					2010	7927920	5460000	67387820	39639600		180000000	3800000	10	0.149	10	0
125					2011	7927920	5460000	67387320	39639600		18000000	3800000	10	0.149	10	0
126 127	Geoker Nie, Ltd	1170240-02	32434784.6	36.26	2012 2008	7949760 3203200	5460000 3060000	67572960 190190000	39748800 400400	436800	18000000	3800000 2500000	10	0.149	10 600	0 3878345.45
128	Factory 4	11/00540.55	52404704.0	50.20	2008	3194400	3060000	189667500	399300	435600	11500000	2500000	8	0.149	600	3800045.45
129					2010	3194400	3060000	189667500	399300	435600	11500000	2500000	8	0.149	600	3806045.45
130					2011	3194400	3060000	129667500	399300	435600	11500000	2500000	8	0.149	600	3806045.45
131					2012	3203200	3060000	190190000	400400	436800	11500000	2500000	8	0.149	600	3878345.45
132	Stallion plastic ind.	5158016.51	46565683.79	11.07	2008	7927920	1800000	56936880	1441440		25000000	3500000	5	0.149	85	2577880
133	Ijeshatede/Cele				2009	7906140	1800000	56780460	1437480		25000000	3500000	5	0.149	85	2569960
134	Busstop, Apapa				2010 2011	7906140	1800000	56780460	1437480		25000000	3500000 3500000	5	0.149	85	2569900 2569900
135 136	Oshodi Expressway Factory 1				2011	7906140 7927920	1800000	56780460 56936880	1437480 1441440	1513512	25000000	3500000	5	0.149 0.149	85 85	2509960
137	Stallion plastic ind.	5181928.9	40505083.79	11.02	2008	6342336	1835000	48778329.6	1153152	1305304	25000000	3500000	5	0.149	70	2508163.29
138	ljeshatede/Cele				2009	6324912	1836000	48044323.2	1149984		25000000	3500000	5	0.149	70	2558888.09
139	Busstop, Apapa				2010	6324912	1836000	48044323.2	1149984	1301718	25000000	3500000	5	0.149	70	2558888.09
140	Oshodi Expressway				2011	6324912	1836000	48644323.2	1149984	1301718	25000000	3500000	5	0.149	70	2558883.09
141	Factory 2				2012	6342336	1836000	48778329.6	1153152		25000000	3500000	5	0.149	70	2568163.29
142	Stallion plastic ind.	2701559,48	46565683.79	5.8	2008	810409.6	1836000	14358344	896896		25000000	3500000	5	0.149	23.33	434479.91
143 144	Ijeshatedo/Cele Busstop, Apapa				2009 2010	808183.2 808183.2	1830000 1830000	14318898 14318898	1756920 1756920		25000000	3500000 3500000	5	0.149	28.38	1793260.22 1793260.22
144	Oshodi Expressway				2010	808188.2	1835000	14318595	1756920		25000000	3500000	5	0.149	25.55	1793200.22
140	Factory 3				2012	810409.6	1835000	14338344	1761760		25000000	3500000	5	0.149	23.33	1799737.02
147	Stallion plastic ind.	4115900.88	46565683.79	8.84	2008	4295491.2	1830000	73993920	900900		25000000	3500000	5	0.149	120	2059819.25
148	Ijeshatede/Cele				2009	4283690.4	1830000	78790640	958820	1022208	25000000	3500000	5	0.149	120	2052537.97
149	Busstop, Apapa				2010	4283690.4	1836000	78790640	958320		25000000	3500000	5	0.149	120	2052537.97
120	Oshodi Expressway				2011	4283690.4	1836000	73790640	958320		25000000	3500000	5	0.149	120	2052537.97
151 152	Factory 4				2012 2008	4295491.2 3523520	1830000	78993920 92892800	960900 640640		25000000	3500000	5	0.149	120 220	2059319.25 6717984
152	Stallion plastic ind. Jieshatedo/Cele	18427887.56	40000083.79	28.84	2008	3523520 3513840	1836000	92892800 92637600	640640 638880	752752	25000000	3500000	5	0.149	220	6717984 6696578
135	Busstop, Apapa				2010	3513840	1836000	92637600	635850	730584	25000000	3500000	5	0.149	220	6090578
155	Oshodi Expressway				2011	3513840	1836000	92637600	638880	750084	25000000	3500000	5	0.149	220	6090578
156	Factory 5				2012	3523520	1836000	92892800	640640	752752	25000000	3500000	5	0.149	220	6717984
157	Stallion plastic ind.	16515146.99	46565683.79	35.47	2008	3127124	1836000	50829979.2	568568	720720	25000000	3500000	5	0.149	160	8263067.03
128	ljeshatede/Cele				2009	3118533	1836000	50690336.4	567006	718740	25000000	3500000	5	0.149	160	8285855.28
139	Busstop, Apapa				2010	8118538	1830000	50690336.4	567006	718740	25000000	3500000	5	0.142	160	8285855.28
160	Oshodi Expressway				2011 2012	3118533	1836000	50590336.4	567006	718740	25000000	3500000	5	0.149	160	8285855.28
161 162	Factory 6 Stallion plastic ind.	15749091-15	40715102.70	31.68	2012	3127124 3523520	1830000	50829979.2 25625600	568568 640640	720720 816816	25000000	3500000	5	0.149	160 100	8263067.03 7914192
163	licshatede/Cele	10140001.10	42722002.72		2009	3513840	1836000	25555200	635850	814572	25000000	3500000	5	0.149	100	7587814
164	Busstop, Apapa				2010	3513840	1830000	25555200	635850	814572	25000000	3500000	5	0.149	100	7887814
165	Oshodi Expressway				2011	3513840	1836000	25555200	638880	814572	25000000	3500000	5	0.149	100	7687814
166	Factory 7				2012	3523520	1836000	25625600	640640		25000000	350000	5	0.149	100	7740942
167	Stallion plastic ind.	10799156.78	46565683.79	23.19	2008	5285280	1830000	19219200	900900		25000000	3500000	5	0.149	60	5403424
168 169	Ijeshatede/Cele				2009	5270760 5270760	1836000	19166400 19166400	958320 958320		25000000	3500000	5	0.149	60 60	5885208 5885208
170	Busstop, Apapa Oshodi Expressway				2010	5270700	1836000	19166400	958320		25000000	3500000	5	0.149	60	5385208
171	Factory 8				2012	5285280	1835000	19219200	960900		25000000	3500000	5	0.149	60	5403424
172	Stallion plastic ind.	14339001.29	46565683.79	30.79	2008	4932928	1830000	22422400	890896	1005064	25000000	3500000	5	0.149	80	7173816
173	licshatedo/Cele	-			2009	4919376	1836000	22300500	894432		25000000	3500000	5	0.149	80	7150947
174	Busstop, Apapa				2010	4919376	1836000	22360500	894432	1052138	25000000	3500000	5	0.149	80	7150947
175	Oshodi Expressway				2011	4919376	1836000	22360800	894432	1052138	25000000	3500000	5	0.149	80	7150947
176	Factory 9				2012	4932928	1836000	22422400	890896		25000000	3500000	5	0.149	80	7173816
177	Sascap Industry Ltd	313294938.3	152620652.4	205.28	2008	261371088	5837280	330755040	24868800		40000000	7800000	10	0.149	52.5	78209843.50
178	Pict C85, Amuwo Odoffo, Jadustalaa				2009	200538090	5837280	329701680	24789600		40000000	7800000	10	0.149	52.5	78017371.56
179	Odofin, Industries Estate.Oshodi Apapa				2010 2011	200538090 200538090	5837280 5837280	329701680 329701680	24789600 24789600		40000000	7800000 7800000	10	0.149 0.149	52.5 52.5	78017371.56 78017371.56
180	Estate, Ushodi Apapa Factory 1				2011	260338090	5837280	330755040	24268500		40000000	7800000	10	0.149	52.5	78209843.56
182	Sascap Industry Ltd	393688830	152620652,4	257.95	2008	232329856	5897280	249351168	22105600		40000000	7800000	10	0.149	40	98836424
183	Plot C85, Amuwo				2009	281589952	5897280	248557056	22035200		40000000	7800000	10	0.149	40	98085928
184	Odotin, industries				2010	231589952	5697280	248557056	22035200	27544000	40000000	7800000	10	0.149	40	98085928
	Estate, Oshodi Apapa				2011	231589952	5897280	248557056	22035200		40000000	7800000	10	0.149	40	98085928
186	Factory 2				2012	282829856	5897280	249351168	22105600	27632000	40000000	7800000	10	0.149	40	98336424

4.0 Conclusion and Recommendation

Models and their implementation software, Rapluc-Comparator used for evaluating profit that will be lost to underutilization during the useful life of a production system were developed in this study. Analysis of some Nigerian manufacturing industries using this software revealed low capacity utilization rate as one of the major causes of high cost of products of small and medium scale manufacturing firms as well as incessant liquidation of many indigenously owned/managed industries in this country. This is because entrepreneurs at this level are not sensitive to the negative effect of huge profit they sacrifice daily to underutilized capacities on the stability of their firms in a stiff market competition. Rapluc-Comparator is therefore recommended to operators of industries for self-assessment of their potentials for continuous existence and robustness in stiff market competition.

References

Akindele, C. (2014). Capacity Utilization in the manufacturing sector is still very low. Daily Independent Saturday, April 05, 2014

Anwar, S. and Moudud, J. (2004), *Measuring Capacity Utilization in OECD Countries: A Cointegration Method* (2004), Working Paper No. 415. The Jerome Levy Economics Institute of Bard College.

Berndt E. and Morrison J. (1981). Capacity utilization measures: Underlying Economic Theory and an Alternative Approach", American Economic Review, 71, (2007), pp. 48–52

Chijioke (2010). Evaluation of the Effect of Capacity Utilization on Replacement Potentials of Nigerian Manufacturing Companies Using Future Worth method. Department of mechanical engineering. Michael Okpara University of Agriculture, Umudike

Corrado, C. and Mattey J. (1997), Capacity Utilization, Journal of Economic Perspectives. Vol. 11, No.1. pp 151-167.

Dauda, R. O. (2006): "The Determinants of Manufacturing Sector Growth Performance in Nigeria. "Nigerian Journal of Economic and Social Studies, Vol. 5, pp. 67-70.

Hosen, M. Z., Nabi, M. N. and Fahmida, N. (2011). Efficiency Measurement of Capacity Utilization in Pharmaceutical Industry. The Cost and Management. pp. 25-34.

James, C. (2002) "Why there is chronic excess capacity - The Market Failures Issue", in: Challenge, Nov-Dec,

Johanson, I. (1988). Production functions and the concept of capacity, Collection Economie et Mathematique et Econometrie, 2, pp. 46–72

Kim, H. Y. (1999). Economic capacity utilization and its determinants: Theory and Evidence, Review of Industrial Organization. Vol.15, No.4. pp. 321-339.

Ogwuma (1995) "Revitalizing the Manufacturing industry in Nigeria." Bullion publication of the Central Bank of Nigeria, April/June.

Olorunsola, J. A. (2002): "Basic Features of Nigeria's Manufacturing Sub-sector", Bullion Publication of the Central Bank of Nigeria (CBN), Oct/Dec. Vol. 26, No. 4.

Omer Gokcekus (1998). Trade liberalization and capacity utilization: New evidence from the

Turkish rubber industry, Empirical Economics, Vol.23, pp. 561-71.

Onwualu A. P., Oluka, S. I. and Offiong. A. (2002). Principles of Engineering Project Management. SNAAP Press Ltd, Enugu. pp. 133.

Rasche.R.H and J.A.Tatom(1977), The effect of the new energy regime on economic capacity, production and prices, Federal Reserve Bank of St. Louis Review, 59(4), pp 2-12.

Ray, S. C and Kankana M. (2005) Direct and Indirect measures of capacity utilization: A non-parametric approach of US manufacturing, The Manchester School, Vol.74, No.4, pp. 526-48, July 2006.

Shebeb, B. (2002). "Productivity Growth and Capacity Utilization in the Australian Gold Mining Industry": A Short-Run Cost Analysis", *Economic Issues*, Vol.7, Part 2, 2002.

Susan_Strange and Roger Tooze (2004), the International Politics of Surplus Capacity: Competition for Market Shares in the World Recession (London: Allen & Unwin, 1981).

Ukoha, O. O. (2000). Determinants of Manufacturing Capacity Utilization in Nigeria, 1970 1998". *The Nigeria Journal of Economics and Social Studies*, Vol. 42 (2): 121-130.

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