Assessing the Capacity Strategic Options on Capacity Utilisation of Manufacturing Firms in Rivers State, Nigeria

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Abstract

This study examined capacity strategies that enhance capacity utilization with sample size of 33 manufacturing firms in Rivers State, Nigeria. The data was collected through the use of 23-item ICAM Questionnaire and was analyzed with the aid of SPSS, version 17. It was found that, constant product output and constant direct labour has a strong positive relationship with capacity utilization with correlation co-efficient (r) =0.64, and (r) =0.813 respectively; that positive relationship exist between backorder and capacity utilization with correlation coefficient (r) = 0.781. It was therefore concluded that, capacity strategy has influence on firm's capacity utilization rate. The capacity level selected also, has a critical influence on the firm's response rate in meeting demand, cost structure, inventory policies, and management/ staff support requirements. The study recommends that, manufacturing firms should employ level capacity management strategies to ensure that they meet customers' demand, while the firms should focus on inventory levels of finished products, capacity utilization, maximizing employee productivity and create value for customers.

Key words: *Capacity strategy, Level capacity, Chase capacity and Capacity utilization.*

1. Introduction

The economic significance of capacity utilization can be expressed in the level of demand. If market demand grows, the rate of utilization of capacity will increase as it is expected that output will rise. Also, if demand decreases, capacity utilization will likely fall. This is a product of the capacity decisions in the production process over the planning period. Capacity utilization is the proportion of available capacity that is utilized and is quantified by the ratio of actual output to capacity output (Nelson, 2000; Slack, Chambers and Johnston, 2008).
Identified capacity strategies are the 'level' capacity strategy with a uniform output level; and the 'chase' capacity strategy with uneven output levels (Hill, 1989; Miltenburg, 1995; Slack *et al.*, 1995; and Rudberg and Alhager, 2003). However, capacity strategic options chosen are primarily a function of demand. The concept of capacity was identified as policy guidelines in the work of Glueck, Kaufman, and Wallect *(*1984); who categorized production management policies into three policy areas as demand matching, operations smoothing and subcontracting.

However, Bagshaw (2014) suggested appropriate scheduling practices such as master scheduling which is the basis for meeting customer delivery promises, plant capacity utilization, attaining the firm's strategic objectives as shown in the production plan and balancing trade-off between manufacturing and marketing in production activity in meeting expected demand. This appears to flow from the reasoning that the demand for the firm's product is in a state of flux as low demand or high demand levels can be estimated by applying forecasting techniques.

The main point for an organization to plan capacity usage in advance is to match its supply competence and capability levels with the predicted demand by the customer. This twin factor of meeting demand and having smooth operations of manufacturing firms can be characterized by adopting capacity strategic options that can enhance capacity utilization (Teemu, 2011; Sofronis and George, 2000). Therefore, the study examined the capacity strategies of manufacturing firms in Rivers State, Nigeria, that will enhance capacity utilization.

2. Literature

Capacity refers to the limitation, which the operating element is able to process: the amount of services executed or tangible products produced (Teemu, 2011). The vital elements and considerations needed to be taken into account before-hand are what type of capacity (equipment, space or human skills) are needed, how much of it is required and the time frame that will be accessible (Beamer 2010). The accuracy of the capacity plan is in sync with the company's ability to maximize their capabilities, enabling them to have precise response to the needs of the customer.

If the demand becomes excessive, through a detailed plan it is easy to seek out the required steps to be taken in order to satisfy such demand. Insufficient or inadequate capacity may turn out to be costly for the company as unpleased customers are lost and such a market attracts competition faster (Jacobs & Chase 2008).

Furthermore, possibilities to adjust capacity to meet demands are deeply associated with the flexibility of the resources. Flexibility refers to the ability of the manufacturing firm's capacity to adapt to changes; multi-skilled employees, overtime, outsourcing and backorders in situations of higher demand level. Most firms perform a mix of human, physical and material resources in terms of flexibility (Delarue, Gryp and van Hootegem 2006).
Chase and Aquilano, (1985) argued that some of the most prominent strategies of aggregating planning are: a) Maintain a level workforce; b) Maintain a steady output rate; c) Match demand period to period; d) Use a combination of decision variables. Examining the content of these strategies, it appears that the first three strategies are pure strategies as each has a single focal point; the last strategy is a mixed one. Maintaining a steady rate of output implies absorbing demand variation with some combination of finished goods inventory, subcontracting, overtime or backordering. Matching capacity to demand implies a 'chase' strategy, the planning output for any period would be the expected demand for that period (Slack *et al*, 1995; Stevenson, 2005; and Rudberg and Olhager 2003).

The level capacity strategy involves maintaining stable workforce level and output rates over the planning horizon. This allows the firm to maintain inventory levels of finished products higher than expected in situations of low demand variability. As demand increases above the steady output rate, the firm can continue to maintain the steady output rate and steady workforce as the surplus inventory of finished products accumulated in periods of low demand can be utilized to absorb the increased demand. The firm using this strategy usually sets up their production level in the forecasting period (usually yearly), and they break down the forecast result on monthly or weekly basis. This strategy prevails in manufacturing firms that have facilities (machines, equipment and materials) that are not easily flexible.

The level capacity strategy, the focus is on the process where product output remains at a somewhat fixed level and increases/decreases in demand are satisfied through strategic decisions of utilizing inventory (maintain buffer stock), outsourcing and backorders. In comparison to level capacity strategy is adjusting capacity to follow demand, which requires a lot more monitoring and controlling and has a certain instability factor as the increases/decreases are made more frequently (Jacobs and Chase 2008).

The other approach would be to use backorders which involves shifting demand to other periods preferably to periods in which demand is lower, thereby smoothing demand requirements over time (Chopra and Peter, 2004). The backorder, allow the movement of demand from one period to another, especially to such periods where the demand can be accommodated together with the normal production rate for that period or to a period where demand is lower but ensuring that such deferred delivery dates are mutually agreed by the consumer (Bagshaw, 2014). It involves how to plan available resources, or where necessary acquiring extra resources in human, production hours available and in managing inventory as to have production efficiency (Chen and Liaw, 2006).
Overtime is used to meet short term increases in demand especially when a very large order is made. Using the strategic option of extra work hours (overtime) is a suitable approach to meet high demand while the firm determines whether there will be need for capacity expansion. It is used as a caution in periods of high demand not in consonant with economic realities of sustained growth in the economic environment.

When a firm could not cope with increased demand, or where available capacity cannot cope with demand, for efficient production the firm can subcontract or outsource quantities of units to other firms. However, negative results of the level strategy would include the cost of excess inventory, subcontracting costs, and backorder costs which are the cost of expediting orders and the loss of customer goodwill (Chopra and Peter, 2004; Peter and Donnna, 2004).

To further express the relationship of the level capacity strategy to capacity utilization the following hypotheses are stated:

H_{o1}: There is no significant relationship between constant product output level and capacity utilization of manufacturing firms.
H_{o2}: There is no significant relationship between constant direct labour and capacity utilization of manufacturing firms.
H_{o3}: There is no significant relationship between backorder and capacity utilization of manufacturing firms.

The chase capacity strategy implies matching demand and capacity period by period (Chase and Aquilano, 1985). In the chase capacity strategy, workforce levels are adjusted through the process of hiring, firing or lay off of production employees to produce output levels to match demand requirements. In situations of high demand variability, necessitating fluctuating schedules, output levels vary as the workforce changes in response to demand. The hire and layoff of employees has some cost implications which according to Banjoko (2002), include recruitment costs involving screening, selection and training; layoff cost which include severity pay; other associated costs of realigning the workforce and the intangible cost of low worker morale. In most cases using this strategy can result in higher employee turnover rate which often leads to apprehensive and displeased employees (Marshal et al, 2013).

Overtime\slack time is the other strategic option in having varying output levels. The use of overtime\slack time is a more useful approach to changing capacity to meet demand. Sometimes, overtime may result in lower productivity, poorer quality, more accidents, and increased payroll costs (Banjoko, 2002). On the other hand, slack or idle time results in less efficient use of machines and other fixed assets. To overcome layoffs especially where company policy is against layoffs, slack time programs can be initiated by stimulating new demand for products or services that require the same production processes in utilizing the excess capacity.

Typically, chase capacity decision is to cope with the customer demand through varying capacity at a given period depending on demand at that period. This strategy basically, is to optimize the gap between capacity and demand: minimize the capacity when the demand is low, maximize the capacity when the demand is high. This set capacity is to deliberately lag demand, using backlog and long quoted lead times to buffer capacity changes (Jacobs and Chase 2008).

The major advantage of a chase strategy is that it allows inventory to be held to the lowest level possible, and for some manufacturing firms, this is a considerable saving. Most firms embracing the just-in-time production concept utilize a chase strategy approach (Chopra and Peter, 2004).

The following hypotheses are stated in the relationship of chase capacity strategy and capacity utilization.

H_{o4}: There is no significant relationship between hire/fire of direct labour and capacity utilization of manufacturing firms.
H_{o5}: There is no significant relationship between over-time/slack-time and capacity utilization of manufacturing firms.

3. Methodology

Data for the research was obtained by the use of 23-item Indigenous Capacity Assessment Model (ICAM) questionnaire to the sample size of 33 manufacturing firms (selected using the Taro Yemen's formula) from the population of thirty six (36) registered manufacturing firms listed with the Manufacturers' Association of Nigeria (MAN) in Rivers State, Nigeria. The total of 33 questionnaires distributed were retrieved, however 28 (84.85%) questionnaires were useful for data analysis, with the remaining 5 (15.15%) of the retrieved questionnaires discarded because they were not completely filled.

4. Data Presentation and Analysis

4.1 Items and Scores on Constant Product Output

Three measurement items in the questionnaire, Q1, Q2, and Q3 were used to collect data on constant product output and the responses and scores presented in Table 1.

Table 1: Items and Scores on Constant Product Output

Q	Items	SD 1	D 2	I 3	A 4	SA 5	Sum	Mean Score	Remark
Q1	There is usually constant production schedule	1	2	0	19	6	28		
		3.57%	7.14%	0%	67.86%	21.43%	100%	4.04	Agree
		3	4	0	76	30	113		
Q2	In an 8-hour work shift period there is usually constant batch production runs	2	4	2	13	7	28		
		7.14	14.30	7.14	46.43	25.00	100%		Agree
		2	8	6	52	35	103	3.68	
Q3	There is usually constant production capacity irrespective of demand for your firm's product	2	5	1	16	4	28		
		7.14	17.86	3.57	57.14	14.29	100%		Agree
		2	10	3	64	20	99	3.54	

Source: Field survey data, 2015.

Table 1 above showed that the respondents agreed on all items of constant product outcome as a measure of level capacity strategy with a mean score > 3.50, especially, that there is usually constant production schedule with a mean score of 4.04.

4.2 Items and Scores on Constant direct labor

Two items, Q4, and Q5 were used to collect data on constant direct labor and the response and scores presented in Table 2.

Table 2: Items and Scores on Constant direct labor

Q	Items	SD 1	D 2	I 3	A 4	SA 5	Sum	Mean Score	Remark
Q4	Factory employee is usually constant from period to period.	1	3	1	17	6	28		
		3.57	10.72	3.57	60.71	21.43	100%	3.86	Agree
		1	6	3	68	30	108		
Q5	Generally, there is constant number of employee in production shift	2	4	2	13	7	28		
		7.14	14.29	7.14	46.43	25.00	100%	3.68	Agree
		2	8	6	52	35	103		

Source: Field survey data, 2015.

The information in Table 2 revealed that the respondents agreed with a high mean score > 3.50, which shows that constant direct labour is a dimension of level capacity of manufacturing firms.

4.3 Items and Scores on Backorder

Three items as in Q6, Q7 and Q8, were used to collect data on backorder. The responses and scores on the items are presented in Table 3.

Table 3: Items and Scores on Backorder

Q	Items	SD 1	D 2	I 3	A 4	SA 5	Sum	Mean	Remark
Q6	Usually there is no consistency in meeting delivery date	5	3	4	14	2	28		
		17.86%	10.71%	14.29%	50%	7.14%	100%	3.18	Agree
		5	6	12	56	10	89		
Q7	There is usually shift in delivery dates in meeting unsatisfied demand for a period due short falls in output	1	1	2	9	15	28		
		3.57%	3.57%	7.14%	32.14%	53.58%	100%	4.29	Agree
		1	2	6	36	75	120		
Q8	That unsatisfied demand for a period is pushed further to another period	1	1	1	11	14	28		
		3.57%	3.57%	3.57%	39.29%	50%	100%	4.29	Agree
		1	2	3	44	70	120		

Source: Field survey data, 2015.

The information in Table 3 above revealed that the respondents agreed on all items of backorder as level capacity strategies with a mean score >4.00 except in the item, that usually there is no consistency in meeting delivery date with a mean score of 3.18.

4.4 Items and Scores on Hire/Layoff

Two measurement items, Q9 and Q10 were used to collect data on hire/layoff. The responses and scores on the items are presented in Table 4.

Table 4: Items and Scores on Hire/Layoff

	Items	SD 1	D 2	I 3	A 4	SA 5	Sum	Mean	Remark
Q9	There is usually hire/layoff in the production run.	4	7	1	14	2	28	3.11	Agree
		14.29%	25%	3.57%	50%	7.14%	100%		
		4	14	3	56	10	87		
Q10	Factory employee is usually not constant from period to period.	3	6	4	9	6	28	3.32	Agree
		10.71%	21.43%	14.29%	32.14%	21.43%	100%		
		3	12	12	36	30	93		

Source: Field survey data, 2015.

The data in Table 4 above showed that the respondents agreed on all items of hire/layoff as a dimension of chase capacity management strategy with a mean score >3.00.

4.5 Items and Scores on Overtime/Slack time

Three measurement items, Q11, Q12, and Q13 were used to collect data on overtime/slack time as chase capacity strategies in influencing production efficiency. The responses and scores on the items are presented in Table 5.

Table 5: Items and Scores on Overtime/Slack time

	Items	SD 1	D 2	I 3	A 4	SA 5	Sum	Mean	Remark
Q11	There is overtime work schedules in increasing output	1	3	2	14	8	28	3.89	Agree
		3.57%	10.72%	7.14%	50.%	28.57%	100%		
		1	6	6	56	40	109		
Q12	There is use of overtime of factory employee in meeting excess demand	2	3	1	17	5	28	3.71	Agree
		7.14%	10.72%	3.57%	60.71%	17.86%	100%		
		2	6	3	68	25	104		
Q13	There is use of slack time of factory employee in reducing output levels in periods of low demand.	7	12	3	5	1	28	2.32	Dis agree
		25.0%	42.86%	10.72%	17.86%	3.57%	100%		
		7	24	9	20	5	65		

Source: Field survey data, 2015.

The information in Table 5 above showed that the respondents agreed on all items of overtime as chase capacity strategies, that there is use of overtime of factory employee in meeting excess demand with a mean score >3.50, except in the item, there is use of slack time of factory employee in reducing output levels in periods of low demand indicating a mean score of 2.32, with respondents disagreeing on the item.

4.6 Items and Scores on Capacity utilization

Three measurement items; Q14, Q15 and Q16, were used to collect data on capacity utilization. The responses and scores on these items are presented in Table 6.

Table 6: Items and Scores on Capacity utilization

Q	Items	SD 1	D 2	I 3	A 4	SA 5	Sum	Mean	Remark
Q14	The capacity utilization of the firm is often above average in constant product output	2	1	0	16	9	28		
		7.14%	3.57%	0.%	57.14%	32.14%	100%	4.04	Strongly Agree
		2	2	0	64	45	113		
Q15	That constant production schedule and constant output improves the capacity utilization of the firm	0	2	1	11	14	28		
		0%	7.14%	3.57%	39.29%	50%	100%	4.82	Strongly Agree
		0	18	3	44	70	135		
Q16	Capacity utilization is optimally achieved in Overtime/slack time in situations where the output level varies from period to period.	7	14	3	3	1	28		
		25%	60.71%	10.71%	10.71%	3.57%	100%	2.11	Disagree
		7	28	9	12	3	59		

Source: Field survey data, 2015.

The data on Table 6 above showed that the respondents strongly agreed on all items on capacity utilization that the level capacity strategy improves capacity utilization of the firm with a mean score > 4.00, where respondents disagreed that the chase capacity enhances capacity utilization with a mean score < 3.

4.7 Items and Scores on Demand Levels

Seven measurement items, Q17, Q18, Q19, Q20, Q21, Q22, and Q23, were used to collect data on demand levels. The demand level was used as a contextual variable. The responses and scores on the items are presented in Table 7.

Table 7: Items and Scores on Demand Levels

Q	Items	SD 1	D 2	I 3	A 4	SA 5	Sum	Mean Score	Remark
Q17	There is always an effort in meeting product delivery dates	1	3	2	16	6	122		
		3.57%	10.71%	7.14%	57.14%	21.43%	100%	3.82	Agree
		1	6	6	64	30	107		
Q18	Manufacturing operations are often successfully completed	9	12	1	4	2	28		
		32.14%	42.86%	3.57%	14.29%	7.14%	100%	2.21	Disagree
		9	24	3	16	10	62		
Q19	The delays in meeting due dates is appreciably minimal in my firm	5	7	4	9	3	28		
		32.14%	25%	14.29%	32.14%	7.14%	100%	2.93	Agree
		5	14	12	36	15	82		
Q20	There is efficient work processes in my firm	2	4	1	10	11	28		
		7.14%	14.29%	3.57%	35.71%	39.29%	100	3.86	Agree
		2	8	3	40	55	108		
Q21	The changes in demand level affects the product output	1	7	0	9	11	28		
		3.57%	25%	0%	32.14%	39.29%	100%	3.79	Agree
		1	14	0	36	55	106		
Q22	Usually production output is due to demand for that period.	1	5	2	9	11	28		
		3.57%	17.86%	7.14%	32.14%	39.29%	100%	3.86	Agree
		1	10	6	36	55	108		
Q23	That price, promotion and product innovation are used in simulating demand.	2	3	4	16	3	28		
		7.14%	10.71%	14.29%	57.14%	10.71%	100%	3.54	Agree
		2	6	12	64	15	99		

Source: Field survey data, 2015.

The data on Table 7, above showed that the respondents strongly agreed on all items on demand levels with a mean score > 3.50, except in the item, manufacturing operations are often completed, having a mean score, 2.21, where respondents disagreed.

4.8 Relationship between Constant Product Output and Capacity Utilization

Following, the items and scores of each of the capacity options as the predictor variable and capacity utilization as the criterion variable, with demand levels as contextual factor, is the analysis of the relationship between each of the capacity strategic options and capacity utilization.

Table 8: Correlation Analysis showing the Relationship between Constant Product Output and Capacity Utilization

Correlations

Type	Variables1	Statistics	Constant Product Output	Capacity utilization
Spearman's rho	Constant Product Output	Correlation Coefficient	1.000	.643**
		Sig. (2-tailed)	.	.000
		N	28	28
	Capacity utilization	Correlation Coefficient	.643**	1.000
		Sig. (2-tailed)	.000	.
		N	28	28

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field survey data, 2015.

From Table 8, the correlation co-efficient (r) = 0.643, showed that very strong positive relationship exist between Constant product output and Capacity utilization.

4.9 Relationship between Constant Direct Labour and Capacity Utilization

Table 9: Correlation Analysis showing the Relationship between Constant Direct Labour and Capacity Utilization

Correlations

Type	Variables1	Statistics	Constant direct labour	Capacity utilization
Spearman's rho	Constant direct labour	Correlation Coefficient	1.000	.813**
		Sig. (2-tailed)	.	.000
		N	28	28
	Capacity utilization	Correlation Coefficient	.813**	1.000
		Sig. (2-tailed)	.000	.
		N	28	28

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field survey data, 2015.

In Table 9, the correlation co-efficient (r) = 0.813, showed that a very strong positive relationship exist between constant direct labour and capacity utilization.

4.10 Relationship between Backorder and Capacity Utilization

Table 10: Correlation Analysis showing the Relationship between Backorder and Capacity Utilization

Correlations

Type	Variables1	Statistics	Backorder	Capacity utilization
Spearman's rho	Backorder	Correlation Coefficient	1.000	.781**
		Sig. (2-tailed)	.	.000
		N	28	28
	Capacity utilization	Correlation Coefficient	.781**	1.000
		Sig. (2-tailed)	.000	.
		N	28	28

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field survey data, 2015.

Table 10 showed that the relationship between Backorder and Capacity Utilization has a co-efficient (r) = 0.781 showed that a very strong positive relationship exist between backorder and capacity utilization.

4.11 Relationship between Hire/Layoff and Capacity Utilization

Table 11: Correlation Analysis showing the Relationship between Hire/Layoff and Capacity Utilization

Correlations

Type	Variables1	Statistics	Hire/layoff	Capacity utilization
Spearman's rho	Hire/layoff	Correlation Coefficient	1.000	.851**
		Sig. (2-tailed)	.	.000
		N	28	28
	Capacity utilization	Correlation Coefficient	.851**	1.000
		Sig. (2-tailed)	.000	.
		N	28	28

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field survey data, 2015.

From Table 11the correlation coefficient (r) = 0.851 indicating that a very strong positive relationship exist between Hire/Layoff and Capacity Utilization.

4.12 Relationship between Overtime/Slack-time and Capacity Utilization

Table 12: Correlation Analysis showing the Relationship between Overtime/Slack-time and Capacity Utilization

Correlations

Type	Variables1	Statistics	Overtime/slack time	Capacity utilization
Spearman's rho	Overtime/slack time	Correlation Coefficient	1.000	.769**
		Sig. (2-tailed)	.	.000
		N	28	28
	Capacity utilization	Correlation Coefficient	.769**	1.000
		Sig. (2-tailed)	.000	.
		N	28	28

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Field survey data, 2015.

Table 12 showed that the relationship between Overtime/Slack-time and Capacity utilization has a correlation coefficient (r) = 0.769 indicating a positive relationship between Overtime/Slack-time and Capacity Utilization.

4.13 Multivariable Analysis and Test of Hypothesis

Having identified the level of relationships existing between the capacity strategic options and capacity utilization, the multivariable analysis was carried out to identify the effect of each of the strategic capacity options on capacity utilization.

The data on the variables of this study were collected with the likert scale are ordinal data, however, the statistical package of social sciences (SPSS) version 17.0 which was used for the data analysis has a transformation procedure that converted the ordinal data to a discrete data showing the multiple correlation, and the coefficient of determination (R^2) which looks at the individual impact of each capacity strategic option in a multiple model on capacity utilization.

Table 13: Summary of the Regression Analysis showing the Effects of Constant Product Output, Constant Direct Labour, Backorder, Hire/Layoff, Overtime/Slack-time on Capacity Utilization

Variables	Coef.	t-cal	sig. t	t-tab $_{(0,05,\ 27)}$	R	R^2	F-cal	F-tab $_{(0.05,5,22)}$	sig f
Constant	0.339	0.914	0.371						
CPO	0.353	2.239	0.036						
CDL	0.337	1.050	0.305	2.05	0.859	0.738	12.41	2.66	0.000
BO	0.486	2.348	0.028						
HL	-0.043	-0.166	0.870						
OS	0.330	1.056	0.302						

Dependent Variable; Capacity Utilization

Source: *SPSS 17.0 Output (based on 2015 field survey data).*

$$CU = \delta_o + \delta_1 CPO + \delta_2 CDL + \delta_3 BO + \delta_4 HL + \delta_5 OS + U_2 \quad \ldots 2b$$

$$CU = 0.339 + 0.353CPO + 0.337CDL + 0.486BO - 0.043HL + 0.33\ OS$$

Table 13, showed that the multiple correlation co-efficient R = 0.859. This coefficient is very high indicating that a very strong positive relationship exists between the dimensions of Capacity Strategy and Capacity Utilization.

The Coefficient of Determination (R^2) = 0.738, implies that 73.8% variation in Capacity utilization is explained by variations in Constant Product Output, Constant Direct Labour, Backorder, Hire/Layoff, and Overtime/Slack-time. Thus, the remaining 26.2% can be explained by other variables not included in the model. The Test of model Utility conducted showed that the model was useful (the F-calculated of 12.41 had a corresponding significant f-value of 0.000). Conventionally, the decision is to accept the F-statistic as a good model, if the critical F value is less than the calculated value of F. From the analysis, F-cal = 12.41> F-tab $_{(0.05,5,22)}$ = 2.45 hence there is a significant influence of capacity strategies in maximizing capacity utilization of manufacturing firms in Rivers state, Nigeria.

Ho_1: 'There is no significant relationship between Constant Product Output and Capacity Utilization of manufacturing firms'

From Table 13, Constant Product Output had a significant effect on Capacity Utilization (t-cal. 2.239> t-tab $_{(0.05,\ 271)}$ = 2.05, and the corresponding significance value of 0.036< 0.05); therefore, the null hypothesis was rejected, thus, constant product output has a significant influence on maximizing capacity utilization of manufacturing firms.

Ho_2: 'There is no significant relationship between Constant Direct Labour and Capacity Utilization of manufacturing firms'

Also, Table 13, Constant Direct Labour did not significantly affect Capacity Utilization (t-cal. 1.050< t-tab $_{(0.05,27)}$ = 2.05, furthermore, the corresponding significance of 0.305> 0.05), therefore, constant direct labour does not significantly impact on capacity utilization.

Ho_3: 'There is no significant relationship between Backorder and Capacity Utilization of manufacturing firms'

From Table 13, the corresponding significance of 0.028< 0.05) and the t-calculated value = 2.348(t-cal. 2.348> t-tab $_{(0.05,\ 27)}$ = 2.05), suggesting that, there is a significant relationship between backorder and Capacity utilization.

Ho_4: 'There is no significant relationship between Hire/Layoff and Capacity Utilization of manufacturing firms' From Table 13, the analysis showed negative values, (t-cal. /-0.166< t-tab $_{(0.05, 27)}$ = 2.05, indicating the negative effect of this strategy on capacity utilization. Additionally, the corresponding significance value is greater than the acceptable level of significance (0.870> 0.05), therefore, hire/fire contributes negatively in maximizing capacity utilization.

Ho_5: 'There is no significant relationship between Overtime/Slack-time and Capacity Utilization of manufacturing firms'

From the analysis on Table 13, the corresponding significance value = 0.302 is greater than the acceptable level of significance (0.302> 0.05), and also, the t-value calculated = 1.056, is less than the t-tab = 2.05 (t-cal. 1.056< t-tab $_{(0.05, 27)}$ = 2.05), indicating that, the null hypothesis is accepted and that overtime/slack-time do not significantly affect capacity utilization.

5. Discussion

Level capacity strategy means that the capacity of the firm is equally utilized over time and the stock or delivery time is changing as the demand fluctuates (Anna and Carl-Johan, 2013). The analysis on Table 6 showed that the respondents strongly agreed on all items of capacity utilization and that the level capacity strategy improves capacity utilization of the firm with a mean score > 4.00. In agreement to this, Anna and Carl-Johan (2013) opined that the level capacity strategy allows the firm to maintain inventory levels of finished products higher than expected in situations of low demand variability, hence a steady production output per period. The level capacity, which uses a constant workforce and produces similar quantities each period, uses inventory of finished products and backorders to absorb demand peaks.

In order to satisfy changes in customer demand, the firm must raise or lower inventory levels in anticipation of increased or decreased levels of forecast demand. As demand increases, the firm is able to continue a steady production rate/steady employment level, while allowing the inventory surplus to absorb the increased demands which are geared towards the full utilization of the available capacity (Chopra and Peter, 2004). The main advantage of level capacity strategy is that costly capacity changes such as overtime and subcontracting are avoided (Anna and Carl-Johan, 2013), meaning that capacity is fully utilized. Also companies want to utilize their existing capacity as much as possible to get return on their investments (Christopher, 2005). For the chase strategy, flexible working hours, different numbers of staff and often different numbers of equipment in each period is required. It is suitable for companies which produce either perishable goods or cannot store their outputs. It has a clear advantage of having the appropriate level of staff all the time according to the demand of a particular season (Alp and Tan, 2006).

The data on Table 6 in the analysis showed that respondents disagreed that the chase capacity enhances capacity utilization with mean score < 3. To this, Banjoko, (2002); Chopra and Peter, (2004), posited that chase strategy could result in a considerable amount of hiring, firing or laying off of employees; increased inventory carrying costs; problems with labor unions; and erratic utilization of plant and equipment. It also implies a great deal of flexibility on the firm's part. Also, this strategy is mainly used when demand is not predictable and there is not any inventory. In most cases using this strategy can result in a higher employee turnover rate which in turn leads to apprehensive and displeased employees (Marshal et al, 2013).

According to Jacobs and Chase (2008), when order backlogs are low, employees may feel compelled to slow down out of fear of being laid off as soon as existing orders are completed. The morale of the employees is lowered which causes lower productivity and a disruptive environment. If productivity is slowed down, orders could be late, affecting the organization's ability to acquire future orders (Marshal et al, 2013).

6. Conclusion

Capacity decisions are generally strategic decisions involving investment commitment in resources, needed in the production of goods and services. Thus, capacity decisions greatly affect a myriad of organizational functionalities. These decisions have an enormous influence on the ability to meet future demands for the products produced by the manufacturing firm. Costs are widely influenced by capacity decisions as operating costs are larger when there are investments in resources. Additionally, the initial cost of the product is determined by the unit cost, which is normally a direct derivation from the costs of the capacity used. Company policy may set constraints on the available options or the extent to which they can be used.

Also, the human resource policies in staffing relating to hire and layoff and labour relations, and also, the marketing policies in terms of pricing, promotion and distribution, as well as new product development policies are important in the strategies of managing capacity. It is the uncertainty of demand level which gives rise to capacity planning. Therefore under uncertainty, manufacturing firms identify their present capacity state bearing in mind room for future expansion due to increased levels of capacity need in meeting higher levels of product demand.

It is expedient that reliable demand forecast is carried out and the firm follows a strategic capacity option that will optimize the firm's overall business objectives. The concept of demand as an input in capacity management has been classified differently. Hsu (2002), Gaimon and Burges (2003) accept unsatisfied demand as an input to capacity management while others considered the overall demand as an input to capacity management. Rajagopalan and Swaminathan (2001); Perron et al., (2002); and Ryan (2004) added another dimension of considering the uncertainty in product demand. Product demand levels can thus be seen to create a moderating effect in the relationship between capacity strategies and capacity utilization of manufacturing firms.

Furthermore, the capacity level selected has a critical influence on the firm's response rate, its cost structure, its inventory policies, and its management and staff support requirements. If capacity is inadequate, a company may lose customers through slow service or by allowing competitors to enter the market. If capacity is excessive, a company may have to reduce prices to stimulate demand; underutilize its workforce; carry excess inventory; or seek additional, less profitable products to stay in business.

7. Recommendations

Based on the study findings, the study recommends that the manufacturing firms should employ the level capacity management strategies to ensure that they meet the customers' demand; and that reliable demand forecast should be carried out periodically, usually monthly. It is further recommended that manufacturing firms are expected to focus on the inventory of finished goods, capacity utilization, maximizing employee productivity and create value for customers.

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