

## AGILE PRODUCTION: A SYNTHESIS FOR CAPACITY EFFECTIVENESS OF AGRO FIRMS IN RIVERS STATE NIGERIA

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Article Information	ABSTRACT
Received: 10 <sup>th</sup> January, 2024	<i>The study examined how agile production correlates with capacity effectiveness of agro firms I the Rivers state. The aim and objective of the study was to empirically determine how variables of the study relate with each other and to determine cause and effect relation considering the outcome of each variable studied. The study was necessitated as a result of the apparent suboptimal ineffectiveness in their operation capacity given the high demand for their product in the state. The study adopted a correlation research design with the use of primary data. Spearman statistical tool was used to analyze responses elicited from respondents in the structured questionnaires administered, and regression analyses was further used to identify the cause and effect relationship between variables studied. Finding revealed a positive significant correlation, and isolating variables that are of high tendency to maximize capacity optimality among studied firms. Conclusions and recommendations were drawn amongst was, agile production is a flexible customers driven strategy that enables firms optimize their productive activity in sync with limited resources available.</i>
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### 1.1 Introduction

Customers are very selective in the goods or services they exchange their money for simply for the purposes of deriving actual or real value for every money spent on the product they consume. Waribo, et al. (2023), accreted that, this has increased their ability to change or been selective from one product to the other in order to maximize value for satisfaction. Conversely, it was also seen in the work of Melvin, & Batistuta, (2022) that, organization must increase or adjust to the increase change in the taste drift of consumers by ensuring that their capacity to produce what they should must adequately satisfy and need the demand of customers' preference. Hence, Aduma, & Shaldule, (2023) posited that, productive factors

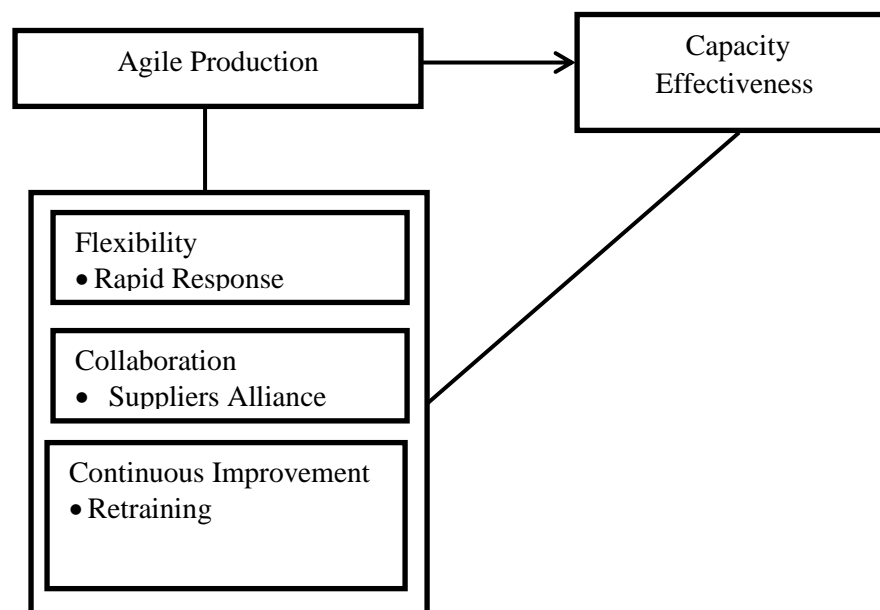
such as materials, machines, knowledge, technology and the required information need to be in right combination to stimulate speed and accuracy.

Elumon, & Ariolu, (2022) avowed that, the agility needed is the systematic approach to drive productive activity, by been flexible to changing demand, needs, of customers and as well maintaining quality, price and production coast constant. Also, Achiomo, & fashiola, (2023), contributed that, in our fast evolving world, organization are in constant search for knowledge, required skill, technology that is appropriate for conversion to tangible or intangible value necessary to meet standard capable to instill customers retention and to increase their market share. Consequently, Egile, et al., (2023), observed that, based on agile development introduced by software development industry, it seeks to draw inspiration into the realm of production and operations management. Lee. Et al., (2023), identified that, the core objective of this strategic approach was to craft the manufacturing sector that is efficient and responsive to the dynamic changes in customer preferences, market trends and its external constrains. Its dimensions are flexibility, rapid response, collaboration and continuous improvement (Marshal, et al., 2023)

### 1.2 Problem of the Study

Changes arising as a result of customers' consumption preference, purchasing habit and drift from one product to the other has immensely contributed to firms ability to be electronically responsive in their capability to remain in business as well as to adequately meet and satisfy customers want timely. In the bit of such responsiveness, some factors has posed delineating constrains to their productive capabilities, such as supply variability of rain dependent agricultural inputs which forms a lager stock of agro manufacturing firms raw material. This is most challenging giving the poor state of storage facility that are capitally intensive for these firm to strategically adopt back ward integration in order to sustain market demand. It is contingent on this that the researcher seeks to empirically determine the correlation that existed between agile production and capacity efficiency of agro manufacturing firms in Port Harcourt Rivers State, Nigeria.

### 1.3 Conceptual Framework



**Figure 1:** Adopted Conceptual Frame Work

**Source:** Marshal, et al., (2023), and Researcher's Conceptualization (2023)

## 1.4 Objective of the Study

The specific objectives of the study were identified as:

1. To ascertain the extent to which flexibility relates with capacity effectiveness in the studied organization
2. To ascertain the extent to which collaboration influences capacity effectiveness in the studied organization
3. To ascertain the extent to which continuous improvement influences capacity effectiveness in the studied organization

## 1.5 Research Questions

The research questions identified below were formulated to guide the researcher in carrying out the study.

1. To what extent does flexibility relates with capacity effectiveness in the studied organization?
2. How does collaboration influences capacity effectiveness in the studied organization?
3. To what extent does continuous improvement influences capacity effectiveness in the studied organization?

## 1.6 Research Hypotheses

The hypotheses stated below were formulated in the null form

- H<sub>01</sub>:** There is no significant relationship between make flexibility and capacity effectiveness in the studied organization
- H<sub>02</sub>:** There is no significant relationship between collaboration and capacity effectiveness in the studied organization.
- H<sub>03</sub>:** There is no significant relationship between continuous improvement and production capacity in the studied organization

## 1.7 Conceptual Review

Capacity effectiveness is a core priority index for organizational growth and viability. Mafidor, et al., (2023) argued that, it encompasses the production system or mechanism of an organization into its inventory structure, and the readiness or availability of resources (material, human capital, machine and method) to enable productivity. In the study of Samuel. & Walson, (2023), it was seen that, the right understanding of customers' wants and need and the ability for the organization to optimally satisfy these customers' wants and needs at the right time, price and place is a function of capacity effectiveness. Again, Ofor, & Okwu, (2023) posited that, production managers need to concisely evaluate the dynamic of the external environment in relation to marketing activities, feedback in form of recommendation and the expectations of the customers' base of their consumption pattern. The concept of electronic behavior (EB) is that readiness or an organization of a manager to respond to customers' preference or changes in the external environment (Opuwari, et al 2021). Atubo, & Traatule, (2022) alluded that, the responsiveness is for the organization to structure its production activities in a flexible manner will determine their capability to satisfy the changing taste of her teeming customers.

**Flexibility:** agile production is hinged on the concept of organizational flexibility. Ogbe, & Ekpelu, (2022), identified that, where an organization combines technology, productive means and method in responding to the changing demand of customers in the production of goods and services.

**Collaboration:** Oftentimes, organizations depend on the activity or the involvement of middle men or suppliers in the provision of raw or production material. Adel, (2020) observed that, this is most practicable in the agro sector as a result of poor infrastructure ranging from bad road network, poor storage facilities, and fast deteriorating state of agro products. Thus, White, & Wagba, (2023), emphasized that, the engagement of suppliers gained much influence in collaborating with production firms in the industry. Hence, the collaboration with suppliers is a strategic alliance that would increase the readiness to product at the right time (Pakirima, et al., 2023).

**Continuous Improvement:** The right combination of skill, technology, machine, method and process are essential for agile productive of an organization, Thus, Showers, et al., (2023), posited that, human capital would require relevant updating of skill through training means, relevant machines need to be replace for fast and accurate utilization, technology adoption must give space to information requirement that would enable methods and process in maximizing production capability.

## 1.8 Theoretical Models of Agile Production

To reach adequately response to customers' wants, needs and increasing the space of flexibility in producing goods, would require integrating "push" and "pull" production models, which are the most popular production systems nowadays, for controlling a hybrid and automated manufacturing processes in an organization. Thus, Bahalad, et al., (2022) conceptualized that, it is this integrated production model that is most effective for agile manufacturing environment. Shegbasa, et al., (2023) noted that, the in the application of push method, involving material requirement planning (MRP) in its calculations, since it is the basis for distributing materials to the plant. Pull methods is often know as just-in-time (JIT) systems. Ogbe, & Ekpelu, (2022) observed that, the concept is based on the threshold of produce products that adequately satisfy or meet customers' wants, needs and requirements. Glad, & Tagel, (2023), avowed that, the integrated production model is made possible by bring in the theory of constraints (TOC) and optimized production technology (OPT). Shitima, et al., (2022), alluded that, optimized production technology, according to the theory of constraints is a very important theory for understanding constraint resources in a production line by employing both the push and pull concepts. In real terms, bringing in TOC and OPT, an integrated push and pull production model is developed (Pascal, et al., 2023).

## 1.9 Empirical Review

Ukari, et al., (2023), carried out a study on the capacity optimization and productivity od paint manufacturing firms in South South Nigeria. The objective was to ascertain if one best approach of production system can sustain stakeholder's objective. This was as a result of the continuous pressure to maintain equilibrium in markup margin and quality of goods produce. The study adopted survey design and the use of multiple regression analyses for hypotheses testing. Among variables measured, finding revealed a moderate positive significant relationship, while conclusion and recommendation posed that, paint manufacturing firm are more at advantage competitively when one or two method of transformation method is adopted in the production line.

Okechukwu, & Egbo, (2023), examined lean production and organizational performance. This study was aimed at exploring the perception employees have toward the training and development program already provided by the organization and to investigate employees' satisfaction with training programs in their organizations.

Lee. et al., (2023), conducted a study on manufacturing strategies and its relationship with organizational optimization among the employees working at Saudi Industrial Development Fund. The aim of this study is to examine employee perception of training provided by Saudi Industrial Development Fund (SIDF) and its relationship with organizational commitment.

Thompson, et al., (2023), examined the association between capacity production and organizational performance of deposit money banks in Abia State, Nigeria. A cross-sectional research survey was employed. Target population comprises all deposit money banks in Abia State, Nigeria. Forty top level managers were surveyed.

### 1.10 Research Design

The study adopted correlation design, with the use of a structured questionnaire as primary source of Spearman Correlation Co-efficient analytical and Regression. A total number of 90 ([https://www.directory.org.ng/list-agriculture\\_and\\_agro-alied?st=rivers](https://www.directory.org.ng/list-agriculture_and_agro-alied?st=rivers)) agro manufacturing manufacturing firms are in Rivers State served as the total population of the study, while 57 firms was used as a sample size. The judgmental or purposive sampling technique of non-probability was adopted for the study. The total respondents of the study was 117, which consisted of 1 (one) production manager and 1 (one) production supervisor from the 57 studied firms. The research instrument was validated at the measure of 0.75, with the use of half spilt validity test instrument.

### 1.11 Data Analyses

**Table 1. Correlation Matrix on all Variable (Bivariate)**

		Flexibility	Collaboration	Continuous Improvement	Capacity Effectiveness
Flexibility	p-Value				
	2t-Value				
Collaboration	p-Value	.65**			
	2t-Value	0.00			
Continuous Improvement	p-Value	.87**	.79**		
	2t-Value	0.00	0.00		
Capacity Effectiveness	p-Value	.72**	.62**	.82**	
	2t-Value	0.00	0.00	0.00	

N	117	117	117	117
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**Source: SPSS 25.00 Output. Field Survey, (2023)**

Table 1 revealed that all variable tested and analyzed were positively correlated

**Table 2 Linear Regression on all Independent Variables**

Model	B	Beta	t	Sig.
(Constant)	0.64		5.3	0.63
Flexibility	-0.64	-0.52	-7.14	0
Collaboration	-0.69	-0.73	6.85	0
Cont. Improvement	-0.81	-0.79	7.93	0

**Source: SPSS 25.00 Output. Field Survey, (2023)**

a. Dependent Variable: Capacity Effectiveness

Table 2 showed how the predictor variables influenced the criteria variable in the study. Thus, the regression values are  $\leq$  significant value.

**1.12 Discussion of Finding**

In accomplishing objective one, findings from Table 1 showed that flexibility correlated with capacity effectiveness at  $0.00p < 0.72$ ;  $0.64b$ ;  $-7.14t$  respectively. Thus, the predictor variable had a strong positive significant correction with the criteria variable among agro manufacturing industry in Rivers State. This was a direct collaboration with the assertion of Aduma, & Shaldule, (2023), that design of production system should be in a form that could rapidly respond to the changing dynamics of the external environment, with high consideration to meet customers' needs at the right time and place. Table 2 was clear in its findings. The regression value of flexibility was  $-0.64b$  and  $-7.14t$ . These regression values showed a cause-effect relationship, signifying that capacity effectiveness was negatively influenced at the measure of  $-0.64$ . This implied that, if flexibility in production mechanism is decreased to  $-0.64$ , capacity effectiveness will not be attained in the studied industry. The result suggested that agro firms should maintain a level of positive value flexibility measure, in order to adequately satisfy their customers.

Objective two was satisfied also with the use of Table 1 and Table 2. The variables measured, collaboration and capacity effectiveness significantly correlated at a positive measure of  $0.00 < 0.62p$ ;  $-0.69b$ ;  $6.85t$ . From the values, it signified that collaboration as a strategic alliance between agro manufacturing firms and suppliers endangered a strong positive correlation with capacity effectiveness at the measure of  $0.62$ . the regression value also signified that, at the rate of  $-0.69$  collaboration negatively affected capacity effectiveness of agro firm. Thus at any unit decrease below  $-0.69$  would definitely low down productivity threshold, hence causing scarcity of agro products in the market. This findings conforms with the assertion of Egile, et al., (2023). They posited that, the need to selectively determine suppliers as middlemen for your productive material, management should develop a just in time inventory system. This would guarantee loss of idle time and responsive production system that is conformable to external paradigm. Regression values as shown in table 2 revealed accusatory effect between collaboration and capacity effectiveness amongst the studied firms. The value showed that, at the negative measure of  $-0.69$ , capacity effectiveness experienced a decline at a unit increase above  $-0.69$ .

The accomplishment of objective 3 as shown in Table 1 and Table 2 revealed that, continuous improvement and capacity effectiveness were sign at  $0.00 < 0.82p$ ;  $-0.9b$ ;  $7.93t$ . This signified a very strong positive correlation between variables studied. This suggested that retraining of human capital, redesigning product after customers opinion, automated or hybrid machine for productive activity are indicator for optimizing capacity effectiveness Lebari, et al., (2023). Also, the measured regression value signified that, at the unity increase in the negative value above  $-0.79$  affected firms capability for adequately satisfy or meet the needs and want it her teeming customers

### 1.13 Recommendations

1. Firms in the industry should develop a lean manufacturing approach, where total material is optimized
2. The concept of electronic behavior should be adequate studied, understood and applied to create or enable internal-external environment flexibility.
3. Firms in the industry should adopt a combinational manufacturing model that is of best suit for their production chain.

### 1.14 Conclusions

From the findings of the study, it was identified that continuous improvement had a high correlation value amongst variable measured. Thus, its most imperative that firms in the industry prioritize human capital development, investing on multipurpose machines and technological innovation to give space to the concept of electronic behavior. Thus, agile manufacturing makes it possible for organization to respond electronically in the satisfaction and meeting of consumers' needs and wants.

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