Influence of Technological Forces on Production/operations Management of Agribusiness Firms in Nigeria

Ogidi, Armstrong E.

Tondo, D.T.

Department of Agribusiness, University of Agriculture, P.M.B. 2373, Makurdi, Benue State

Influence of Technological Forces on Production/operations Management of Agribusiness Firms in Nigeria

Ogidi, Armstrong E. and Tondo, D.T.

Department of Agribusiness, University of Agriculture, P.M.B. 2373, Makurdi, Benue State

Abstract: *The goal of this study encompasses the use of the Litmuschart and Litmusgraph techniques designed to find a solution to the efficient and effective running of agribusiness corporations in changing environments. The high turbulent influence of the environment on these corporations resulted in selection and matching of technological forces and production/operations management analysis and diagnosis. This parallel relationships were hypothesized, because the study felt that certain forces in the environment affects particular activities or functions within the enterprise. By introducing the simplified EELS technique, the litmuschart and litmusgraph will enable managers to evaluate their businesses regularly and predict future occurrences and employ relevant strategies for better performance. From the forgoing findings, the study concludes that technological forces exert high threats on the production and operations of management; the corporations do not have high efficient and effective structures in place to counter this threat. Turnaround strategy can help managers to reduce cost via personnel reduction, reduction in less crucial maintenance costs, and operations cost. Joint ventures strategy with both local and foreign firms can help to acquire high quality resources – technology, expertise, and raw materials from the environment.*

Keywords: *Agribusiness, management, operations management, production, technological forces*

1. Introduction

Without an effective organizational structure and control strategy to manage the business environment, the organization may not be able to function and perform its goals very well; many agribusiness enterprises/corporations have used the organic system to reshape their structures and functions, which has greatly enhanced better performance (Ogidi and Adekitan, 2013; Ogidi, 2014a). From a study carried out by Ogidi, Adekitan and Odiba (2013) it was found that the business environment is seen to contain factors that influence policy decisions and activities of catfish enterprise production-unit (technical core); the study also introduced the use of a *litmuschart* to analyze and diagnose the business environment of catfish enterprises. In the case of environmental analysis, an ESWP can be developed as a summary and as a more focused account of the distinctive advantages a company has over its competitors (Thompson and Strickland, 1981). According to Glueck the ESWP is developed from the Enterprise Analysis and Diagnosis, and it is to be matched against the ETOP to enable the organization effectively consider and choose its corporate strategy (Thompson and Strickland, 1981). These profiles are outcomes of environmental and enterprise analyses respectively (Ottih, 2006a). It is from this ESWP and ETOP match that this study adopts its theme for designing an efficient and effective

analysis and diagnostic tool for profit oriented organizations (Ogidi, 2014a). Ottih (1998) recommended a *turbulent systems management model (TSSM)* to inform managers and corporate planners of the types of variables which may strongly bear upon and lead to the effective management of turbulent systems. This study adopts the *litmuschart* method to examine environmental and enterprise profiles of 58 agribusiness firms in Nigeria (Ogidi, 2014a; 2014b). The aim of this study, however, is to analyze the influence of technological forces on productions/operations parameters in agribusiness firms in Nigeria. several steps are required for establishing the *litmuschart* test (Ogidi, 2014a; 2014b).

2. Materials and Method

The subjects in this study consisted of functional managers from agribusiness companies listed in 6000 Nigeria Companies Profiles (www.6000profile.com) and Lists-of-Companies (www.list-of-companies.org). This particular group is preferred, because, the corporations are targets of frequent turbulence from the environment. After Taro Yemen sampling technique was employed, a sample frame of 104 companies (i.e. in the areas of food, fibre, beverage and agricultural raw materials) was trimmed out of a po141. A structured 3 page questionnaire was e-mailed to respondents together with a respondent's letter.

2.1. Data Analysis

The extrapolated data from questionnaires were analyzed using computer-based Statistical Package for Social Sciences (SPSS) version 16. Various statistical methods were used. Pearson's Product Moment Correlation, Spearman's Rank Order Correlation – Rho (a non-parametric correlation technique) and Analyses of Variance (ANOVA) were used to test for significance between exogenous and endogenous variables.

3. Findings and Discussion

Four months later, 58 usable questionnaires were received. A success rate of 55.77% was achieved from questionnaire distribution and retrieval (see Table 1). This low response rate may be due to the fact that respondents were not be willing to respond to unsolicited surveys. A few of the companies had sent (e-mailed) policies that ruled against filling survey questionnaires.

Table 1: Questionnaire E-Mailed and Received from Industry Sectors Under Study

Industry Sector	Survey Population	Company's Participation		% of participation success
		No	Yes	
Agricultural greenhouses	16	10	6	5.77
Agricultural product stock	11	8	3	2.88
Animal extract	2	2	0	0.00
Animal feed	8	5	3	2.88
Aquaculture equipment	3	3	0	0.00
Beverage	7	4	3	2.88
Food processing and production	39	4	35	33.65

Farm machinery and equipment	5	3	2	1.92
grains	3	2	1	0.96
Logs	1	1	0	0.00
Plant and animal oil	4	3	1	0.96
Plant fiber	1	1	0	0.00
Poultry and livestock	4	0	4	3.85
Total	**104**	**46**	**58**	**55.77**

3.1. Respondents' View of the Business Environment and Enterprise

An environmental and enterprise litmuschart (EELS) was designed and the various factors and associated enterprise parameters were analyzed and then matched respectively (see Table 2).

Table 2: Environmental and Enterprise Litmuschart (EELC) Highlighting Environmental/Enterprise Match for Technological and Production/operations Management

	VARIABLES	-3	-2	-1	0	+1	+2	+3	Total	EELC Match
	Environmental force									
3	**technological**									**-1**
i	Investment in critical tech. by competitors	15	12	9	8	9	2	3	58	-3
ii	Strategic and financial performance of competitors	11	9	12	10	7	4	5	58	-1
jjj	Evaluation of technologies in the future	9	4	6	7	10	8	14	58	+3
iv	Cost of acquiring new technology	20	15	11	10	2	-	-	58	-3
v	Additional tech. required to achieve objectives	-	-	-	5	16	12	25	58	+3
	Enterprise parameter									
3	**Production/operations management**									**-4**
i	Cost of operations than competitors	14	13	9	14	8	-	-	58	-3, 0
ii	Capacity to meet market demands	2	8	12	16	9	6	5	58	0
iii	Efficient and effective facilities	-	1	11	12	10	15	9	58	+2
iv	Cost of raw materials and subassemblies	34	13	7	4	-	-	-	58	-3
v	Efficient and effective equipment/machinery	3	6	10	12	7	11	9	58	0

Key: - 3 = strong threat/weakness, - 2 = considerable threat/weakness, - 1 = weak threat/weakness, 0 = neutral, +1= weak opportunity/strength, +2 = considerable opportunity/strength, +3 = strong opportunity/strength

(a) Technological and production/operations management match
The *investment in critical technology by competitors* had a strong threat effect (-3) on the corporations; the *cost of operations than competitors* had both strong weakness (-3) and neutral (0) effect within the corporations as indicated by most of the respondents (15 and 14, 14). The *strategic and financial performance of competitors* posed a weak threat (-1) on the corporations; the *capacity to meet market demands* had a neutral (0) effect within the corporations as stated by most respondents (12 and 16). *Evaluation of technologies in the future* might lead to a strong opportunity (+3); *efficient and effective facilities* proved to have a considerable strength (+2) within the corporations as agreed by majority of the respondents (14 and 15). The *cost of acquiring new technology* had a strong threat (-3) on corporations; the *cost of raw materials and subassemblies* within the corporations had a strong weakness (-3) effect as suggested by most of the respondents (20 and 34). *Additional technology required to achieve objectives* could be a

strong opportunity (+3); *efficient and effective equipment/machinery* in use within the corporation had a neutral (0) effect as speculated by majority of the respondents (25 and 12).
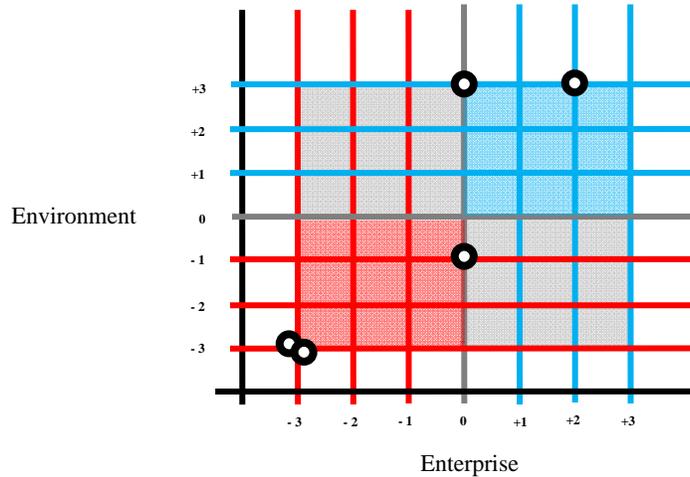
Note: red region = weakness/threat concentration, blue region = strength/opportunity concentration, grey region = neutral concentration

Figure 1: A Diagnostic EELG Indicating Technological and Production/Operations Management Match

3.2. Test of Hypothesis

Preliminary correlation showed a significant Rho value of 0.333, between technological forces and productions/operations items. Pearson's correlation (r) complemented this result with a significant value of 0.586 – both values indicated a fairly weak to moderate relationship between the two variables at a 0.05 significant level. The coefficient of determination ($r^2 = 0.344$) tells us that 34% of productions/operations performance within the studied corporations was caused by variation of the technological environment. The regression (1317.13) divided by the residual (44.09), yielded F = 29.875. The p-value associated with this F-value is zero (0.000). In this study, the ANOVA result revealed that *technological forces have significant effect on productions/operations parameters* at F = 29.875, and 0.05 significant level. The null hypothesis (H0) is therefore rejected and the alternative hypothesis (H1) acceptable.

Table 3: Relationships of Technological and Production/operations Management

VARIABLES	SROC	PRMC		ANOVA						Decision
	Rho	r	r^2	Source	SS	df	MS	F	Sig.	
. Technological and production/operations management	0.333**	0.586**	0.344	Regression	1317.13	1	1317.13	29.875*	0.000	Reject H0₃
				Residual	2512.98	57	44.09			
				Total	3830.10	58				

Note: ** = correlation is significant at the 0.01 level (2 tailed), * = significant P<0.05, PRMC = Pearson's Product Moment Correlation, SROC = Spearman's Rank Order Correlation (non-parametric correlation), ANOVA =

Analysis of Variance, Source = source of variation, SS = sum of square, df = degree of freedom; MS = mean square, F = F-value.

Source: Research Instrument – SPSS Version 21 for Windows

4. Conclusion and Recommendations

The goal of this study encompasses the use of the Litmuschart and Litmusgraph techniques designed to find a solution to the efficient and effective running of agribusiness corporations in changing environments. The high turbulent influence of the environment on these corporations resulted in selection and matching of technological forces and production/operations management analysis and diagnosis. This parallel relationships were hypothesized, because the study felt that certain forces in the environment affects particular activities or functions within the enterprise. By introducing the simplified EELS technique, the litmuschart and litmusgraph will enable managers to evaluate their businesses regularly and predict future occurrences and employ relevant strategies for better performance. From the forgoing findings, the study concludes that technological forces exert high threats on the production and operations of management; the corporations do not have high efficient and effective structures in place to counter this threat.

From our study, the following recommendations are necessary for improvement:

i. the divestment strategy, which entails reduction in assets or captive company strategy, which implies that the company sells more than 75% of its products/services to a single customer be employed;

ii. input-buffering strategy, which allows machines and equipments to be scheduled for repairs periodically to reduce surprises should be considered in the agribusinesses;

iii. turnaround strategy can help managers to reduce cost via personnel reduction, reduction in less crucial maintenance costs, and operations cost; and

iv. joint ventures strategy with both local and foreign firms can help to acquire high quality resources – technology, expertise, raw materials, etc. from the environment

References

Ansoff, H. I. and Sullivan, P. A. (1993). Optimizing Profitability in Turbulent Environments: A Formula for Strategic Success. *Long Range Planning,* 26(5):11-23.

Argenti, J. (1984). Back to Corporate Planning but Don't Let Planners Meddle with Your Strategy. *Accountancy,* April.

Child, J. (1972). Organization Structure, Environmental and Performance: The Role of Strategic Choice. *Sociology,* 6(1): 2-22.

Daft, R.L. (1986). *Organizational Theory and Design.* St. Paul, MN: West Publishing Company. pp. 15-18.

David, F. R. (1995). Strategic Management. Englewood Cliffs. New Jersey: Prentice Hall. p.122.

Duncan, R. S. (1972). The Characteristics of Organization Environment and Perceived Uncertainty. *Administrative Science Quarterly,* 17(3):13-27.

Emery, R. E. and Trist, E. (1965). The Structure and Function of Organization. *Human Relations,* 18:21-32.

Feibleman, J. and Friend, J. W. (1945). The Structure and Function of Organization. *Philosophical Review,* 54:19-44.

Gluek, W.F. (1980). Strategic management and business policy. New York: McGraw Hill Book Company. pp 44-50.

Nigeria Companies Profile (2011). Accessed from www.6000profiles.com on the 5th of December, 2011.

Lynch, R. (1997). *Corporate Strategy.* San Francisco. Pitman Publishing. p.109.

Meyer, A. D. (1982). Adapting to Environmental Jolts. Administrative and Organizational Effectiveness. *Administrative Science Quarterly,* 19(2):31-46.

Ogidi, A. E. and Adekitan, R. (2013). Structural Dimensions and Functions of Structure Influencing Agribusiness Enterprises: Mechanistic Vs Organic Systems Approach. *Journal of Business and Management (IOSR-JBM),* 6(6):1-8.

Ogidi, A. E. Adekitan, R. and Odiba, R. I. (2013). Environmental Analysis and Diagnosis of Catfish Enterprises. *Journal of Business and Management (IOSR-JBM),* 6(6):9-17.

Ogidi, A. E. (2014a). Influence of Market Competition Forces on Market Distribution: A Hypothetical Litmuschart and Litmusgraph Diagnosis of Agribusiness Firms in Nigeria. *SCSR Journal of Agribusiness,* 1(2): 1-10.

Ogidi, A. E. (2014b). Influence of Political/Governmental/Legal Forces on Corporate Resources Parameters: A Hypotheical Litmuschart Diagnoses of Agribusiness Firms. *SCSR Journal of Business and Entrepreneurship,* 1(2):30-39.

Ohmae, K. (1983). *The Mind of the Strategist.* New York: Penguin. pp.158-62.

Olam (2012). Olam International Acquires Kayass Enterprises' Dairy Product. Accessed on the 20th of December, 2012 from www.olamonline.com/olam-intenational-a...

Ottih, L. O. (1996). Organizational Adaptation to Environmental Uncertainty. A Study of Selected Retail Establishemnts in Nwokoye, N. E. and Kalu, S. E. (eds.). *Retailing in Nigeria.* Umuahia, Nigeria: Harcon Publishers. pp.62-74.

Ottih, L. O. (1998). Modeling Organization/Environment Relations for the Management of Turbulent Environments. *West African Journal of Business,* 1(1):17-27.

Ottih, L.O. (2006a). *Organization theory: Structure, design and process.* Port Harcourt, Nigeria: Amex Publications. 119 pp.

Ottih, L.O. (2006b). *General management: Strategy, implementation and control.* (3rd Ed.). Nigeria. Port Harcourt: Pearl Publishers. 246 pp.

Ottih, L.O. (2008). *Modern business: An introduction.* (2nd Ed.). Nigeria. Port Harcourt: Pearl Publishers. 278 pp.

Osborn, R. N. and Hunt, J. G. (1974). Environment and Organizational Effectiveness. *Administrative Science Quarterly,* 19(2):31-46.

Porter, M. E. (1980). *Competitive Strategy.* New York: The Free Press.

Porter, M. E. (1985). *Competitive Advantage.* New York: The Free Press.

Robbins, S. P. (1990). *Organization Theory: Structure, Design and Applications.* London: Prentice Hall International Inc.

Sawyer, O. O. (1993). Environmental Uncertainty and Environmental Scanning Activities of Nigerian Manufacturing Executive: A Comparative Analysis. *Strategic Management*

Journal, 14:287-299.

Smith, A. W. (1982). *Management System: Analysis and Applications.* New York: The Dryden Press.

Terryberry, S. (1968). Evolution of Organizational Environments. *Administrative Science Quarterly,* 12:590-613.

Thompson, A. A. Jr. and Strickland, A. J. III (1981). *Strategy and Policy: Concepts and Cases.* Plano, Texas: Business Publications. p. 3.

Weick, K. E. (1969). *The Psychology of Organizing.* Reading, Massachusetts: Addison Wesley Publishers.