



RELATIONSHIP BETWEEN SUPPLY CHAIN PERFORMANCE AND SUPPLY CHAIN EFFECTIVENESS: A STUDY ON RICE MILLS OF PURBA BARDHAMAN DISTRICT, WEST BENGAL

Debasis Pal

Research Scholar, Business Administration Department, The University of Burdwan, India

Pradip Kumar Mallik

Professor, Business Administration Department, The University of Burdwan, Golapbag, Burdwan, W.B. -713104, India

Tanmoy Dasgupta

Professor, Business Administration Department, The The University of Burdwan, Golapbag, Burdwan, W.B. -713104, India

ABSTRACT

Supply chain is a key area for companies to stay competitive in any business. Like quality of product and service, supply chain is a major concern to both the organizations and customers to ensure continuity of business relationships. Moreover, reliability and management of supply chain confirm customers' trusts and faiths over the company's business operations. The fulfilment of customers' expectations is linked to products/services to their doorsteps that determine the success of Supply Chain. Again, Supply Chain depends upon the capability of the management to conduct the flow of the business effectively, that finally culminates in Supply Chain Performance. With this in view, the present paper makes an attempt to find out the relationship between performance and effectiveness in the industrial units associated with rice production.

KEYWORDS : Supply chain, Supply chain management, Performance, Effectiveness

INTRODUCTION

Business in today's perspective is more competitive compared to earlier times. It must continually perpetuate the developmental efforts from the beginning to the end i.e. raw materials procurement to delivery of finished goods to the customers and execute to remain steady in the run of the competition. Process is the backbone of any business. Supply chain is the backbone of the process. Bridgefield Group (2006) defined supply chain as a connected set of resources and processes that starts with the raw materials sourcing and expands through the delivery of finished goods to the end consumer. In fact, supply chain determines the flow of the business. The flow encompasses several activities that take place in sequential manner uninterrupted. But supply chain is not limited to distribution. Distribution is a physical flow that has a starting point and an end point. Distribution is sourcing the raw materials, delivering it to the point of production, reaching the customers with the finished goods. But, supply chain is not confined to physical flows. The flow is coupled with value addition at each point of contact. At the same time, it is important to see whether value addition at each junction is manifested in performance and efficiency generations. Two important aspects of performance are effectiveness and efficiency. Effectiveness decodes whether suggested procedures or ways that are suggested are goal directed or not and efficiency is related to cost of yielding performances. The present paper takes into consideration two important determinants of business success that are effectiveness and performance. Furthermore, different ramifications of effectiveness and performance such as production effectiveness and production performance, maintenance effectiveness and maintenance performance and five more such variables are considered in the study. An effective supply chain definitely promises to achieve efficiency and performance.

REVIEW OF LITERATURE

A plethora of studies in the field of supply chain management business perspective have been made by academicians, researchers, business professionals etc. A few notable works have been reflected in the following studies.

Ayers (2001) and James (2011) viewed supply chain as co-ordinated and combined flow of goods with a beginning of conversion of raw materials to finished goods and ending with delivery of it to customers to meet their satisfactions where finances and flow of information take vital roles. Christopher (1998) and New and Payne (1995) corroborated supply chain to value generation that improves the performances through co-ordination of logistical functions and Supply Chain Management. Janvier-James (2012) explained the role of supply chain where value addition at each location, feedback from the receivers, identification of flaws and its corrections are integral parts of Supply Chain Management. Lu & Swaminatham (2015) explained that supply chain starts from the design of new product and service

procuring raw materials, transforming it to finished goods and delivering the final products to customers.

Tan (2001) included activities like planning, product design, sourcing, manufacturing, warehousing, transportation, assembly, fabrication, distribution and post-delivery in supply chain. Supply chain involves many drivers that determine supply chain performances and for each driver, efficiency, cost and responsiveness is expected. (Zamparini, 2010). Sharma et al. (2013) focussed upon the design and redesign of supply chain to provide better performance and service particularly in rice production sector. Lambert & Cooper (2000) stressed the need for performance evaluation to analyse the levels of service provided to customers as well as customers' profitability. The logistics and other relevant issues are of great concern regarding profitability and performance of the rice mill industries in the Indian framework for sustainable economic growth. (Hazra, 2021). Cox (1997) and (Stock & Boyer, 2009) illustrated that SCM makes finest use of shared resources by innovating new tools and techniques by linking the suppliers, manufacturers and customers that help in achieving synergy in operations reflected in greater efficiencies and performance. Kohli & Jensen (2010) and Soosay et al. (2008) opined that the effectiveness as supply chain teamwork is enhanced by sharing of information, joint planning, conformity in goals, personal interaction, relationship management and capability of managers to work with the partners in an integrated way. Ostroff, C., & Schmitt, N. (1993) explained effectiveness as a result of perfect level of outcome and the ability of getting resources to achieve that outcome.

The present paper has delved into the supply chain framework of rice mills where role of the supply chain effectiveness plays a pivotal role in the operations of the business. The perfect level of outcome and the ability of getting resources is defined as effectiveness. (Ostroff, C., & Schmitt, N., 1993). Moreover, supply chain performance is the sole aim of rice mill owners to conduct the business profitably. Rice mill owners with their managerial skills strive to find out effective ways to reach organisational goals that tantamount to organisational performance. In view of these, the following objectives are formulated.

OBJECTIVES OF THE STUDY

1. To find out prominent factors that contributes to supply chain performance of the rice mills.
2. To find out the corresponding effectiveness factors that is linked to the performance of the rice mills.
3. To obtain the relationship among factors determining effectiveness and performance of the supply chain in rice mills.

RESEARCH METHODOLOGY

An extensive survey on different literatures relating to logistical management, supply chain management and logistical integration has been made to identify factors influencing supply chain performance.

(Gupta & Palsule-Desai, 2011; George and Pillai 2018; Lu & Swaminathan 2015; Tan, 2001; Stock & Boyer, 2009)The present study purports to examine the effectiveness of the supply chain and its impact on supply chain performance. The relational dynamics of supply chain effectiveness and supply chain performance has been reflected in many a studies. .(Gupta,1999; Groosse, 2000; Cox,1997; Elmuti, 2002; Elcio M. Tachizawa, Cristina Giménez. 2009.)

The following performance and effectiveness factors have been identified to measure the overall performance and effectiveness of the supply chain. These are –

1. Production performance and production effectiveness (adherence to production scheduling, quality control)
2. Maintenance performance and Maintenance effectiveness (quick redressal of production flaws, readiness to address flaws)
3. Financial performance and financial effectiveness (operating profits, gross earnings)
4. Human resource performance and Human resource effectiveness (availability of skilled work force, motivation of the work force)
5. Communication performance and Communication effectiveness (sharing of information among members on prompt basis, quick response to feedbacks)
6. Marketing performance and marketing effectiveness (meeting of customer demands, level of customer satisfaction)
7. Organizational performance and organizational effectiveness (fulfilling the organizational objectives, achieving right co-ordination among supply chain members)

The study puts emphasis on the variables (shown within brackets) indicating components of each factor.

Two sets of scaling methods viz. scaling to measure performance of the supply chain and scaling to measure the effectiveness of the supply chain have been applied to. A five point scale has been designed for each factor to measure performance and effectiveness. In this scale, 5 represents very good effectiveness; 4, good effectiveness; 3, neither good nor bad effectiveness, 2, bad effectiveness and 1, very bad effectiveness. The same pattern of scale is followed in performance measurement.

The study has been made in Purba Bardhaman of West Bengal. The selection of Purba Bardhaman has been highly justified by the fact that it is a highly agriculturally rich district and secondly the density of the rice mill is highest in Purba Bardhaman. There are 300 rice mills located in Purba Bardhaman (Population size obtained from Rice Mill Owners Association in Bardhaman). Simple random sampling has been made to select 150 rice mills from the total population. Therefore, 150 rice mill owners are samples for present study.

HYPOTHESES

In this study, following sets of hypothesis have been drawn.

- a. Ho₁. There are no significant differences between mean scores of production performance and effectiveness.
- b. Ho₂. There are no significant differences between mean scores of maintenance performance and effectiveness.
- c. Ho₃. There are no significant differences between mean scores of financial performance and effectiveness.
- d. Ho₄. There are no significant differences between mean scores of human resource performance and effectiveness.
- e. Ho₅. There are no significant differences between mean scores of communication performance and effectiveness.
- f. Ho₆. There are no significant differences between mean scores of marketing performance and effectiveness.
- g. Ho₇. There are no significant differences between mean scores of organizational performance and effectiveness.

FINDINGS:

Sl. No	Factors	Mean Of Performance	Mean Of Effectiveness	Absolute T-value	Critical Value	Re-remarks
1	Production	3.197	3.237	0.1765	4.303	Accepted
2	Maintenance	3.340	3.757	1.6040	4.303	Accepted
3	Financial	2.680	2.660	0.2029	4.303	Accepted
4	Human Resource	3.004	2.677	3.5839	4.303	Accepted
5	Communication	2.797	3.017	1.3245	4.303	Accepted

6	Marketing	3.204	3.337	0.4381	4.303	Accepted
7	Organisational	3.200	3.357	3.1417	4.303	Accepted

Interpretation Of The Result

The present study has considered seven performance related factors such as a) Production performance, b) Maintenance Performance, c) Financial Performance, d) Human Resource Performance, e) Communication Performance, f) Marketing Performance and g) Organisational Performance. Simultaneously, the corresponding effectiveness factors are a) Production Effectiveness, b) Maintenance Effectiveness, c) Financial Effectiveness, d) Human Resource Effectiveness, e) Communication Effectiveness, f) Marketing Effectiveness and g) Organisational Effectiveness. All these measures are in relation to rice production units located in the district of Purba Bardhaman of West Bengal.

From Table-1, it appears that the average scores of production performance and production effectiveness are 3.197 and 3.237 respectively. Applying the test of equality of these two means to measure statistical significance of the relationships of production performance and effectiveness, the t-value = - 0.17653 is estimated at 5% level of significance. The critical value stands at 4.3. Therefore, null hypothesis of equality of means is accepted. So, production performance might not solely depend upon production effectiveness. Indeed, effectiveness is related to the ability of management to choose the right way and direction in the accomplishment of goals. But always the right way, ideally suggested, may not be realistic enough as several other parameters like labour efficiency, collaborative mentality among workers and lack of co-ordination between management and workers are bottlenecks to achieve performance.

It appears that the average scores of maintenance performance and maintenance effectiveness are 3.340 and 3.757 respectively. Applying the test of equality of these two means to measure statistical significance of the relationships of maintenance performance and maintenance effectiveness, the t-value = - 1.6040 is estimated at 5% level of significance. Thus, it can be concluded that maintenance performance and maintenance effectiveness might not have any significant relationship. Indeed, efficiency and effectiveness might not move in the same direction. Efficiency equate to performance divided by cost whereas effectiveness is an ability factor to select the right method to get the intended results. So the link between efficiency and performance is closer compared to effectiveness and performance.

Furthermore, table 1 shows that the average scores of financial performance and financial effectiveness are 2.680 and 2.660 respectively. Applying the test of equality of these two means to measure statistical significance of the relationships of financial performance and financial effectiveness, the t-value = 0.2029 is estimated at 5% level of significance. Some explanation is tenable in getting a very thin relationship between financial performance and financial effectiveness. Financial performance is dependent upon myriads of factors that often turn out to be volatile and unpredictable. So, simply financial effectiveness despite being accurate and precise might not yield satisfactory performance of the business because of the presence of complex financial variables that might deter achieving satisfactory performance.

Again, average scores of human resource performance and human resource effectiveness are 3.004 and 2.677 respectively. Applying the test of equality of these two means to measure statistical significance of the relationships of communication performance and communication effectiveness, the t-value = 3.5839 is estimated at 5% level of significance. Human resource performance and human resource effectiveness as the result suggests, cannot be corroborated significantly howsoever the procedure is goal bound and presence of capable staff in an organisation, particularly rice mills. Performance may not be evident because of the complex and ever changing behavioural dynamics in an organisation that cannot bind effectiveness and performance in an expected way.

It appears that the average scores of communication performance and communication effectiveness are 2.797 and 3.017 respectively. Applying the test of equality of these two means to measure statistical significance of the relationships of communication performance and communication effectiveness, the t-value = - 1.3245 is estimated at 5% level of significance. The acceptance of null hypothesis regarding the relationship between communication performance and communication effectiveness vouches for poor information

dissemination and sharing, or information overloading are some of the issues in communications that hinders the course of effectiveness vis-a-vis performance

It is evident from the table 1 that the average scores of marketing performance and marketing effectiveness are 3.204 and 3.337 respectively. Applying the test of equality of these two means to measure statistical significance of the relationships of marketing performance and marketing effectiveness, the t-value = - 0.4381 is estimated at 5% level of significance. In a complex and dynamic business environment, steadiness in marketing performance is an utopia. Effective prescription of the marketing strategies, procedures and policies may sound productive in a given environmental situation, but may prove counterproductive while confronting a dynamic marketing environment.

Table 1 shows that the average scores of organisational performance and organisational effectiveness are 3.200 and 3.357 respectively. Applying the test of equality of these two means to measure statistical significance of the relationships of organisational performance and organisational effectiveness, the t-value = - 3.1417 is estimated at 5% level of significance. Organisational performance cannot be construed in the same way as organisational effectiveness. Organisational performance realistically depends upon the performance of several functional areas such as production, human resource, marketing, systems and operations etc. Different business functions in an organisation have different degree of effectiveness and the combination of all these may not ensure the achievement of performance.

Therefore, organizations must emphasise upon supply chain effectiveness i.e. finding the right way to improve the outcomes or getting the right capability to get the desired output. If organization moves in the right direction from the point of view of effectiveness, performance can be delivered provided supports from other functions contribute to it.

CONCLUSION

The present study has made an earnest attempt to observe and note different performance and effectiveness factors of rice producing units in Purba Bardhaman district of West Bengal. Especially, the supply chain framework of the rice mills and its operations from the side of its effective operations and its relations to performance. The study breaks up overall effectiveness as well as performance into seven parameters and tries to depict the relationship between the two sets of parameters. The study reaches into conclusion that absence of relationship between each component of effectiveness and each component of performance categorically suggests that presence of effectiveness in its each component may not ensure the corresponding performance. This means that business performance is not solely dependent upon organisational effectiveness in today's complex and vibrant business environment. Capability of the management or doing the right things or doing that should be done may not produce the desired results. Getting synergistic benefits by combining all business functions in an effective and efficient way may sound well, but in reality this is hard to achieve.

REFERENCES

1. Ayers, J. B. (2001). *Handbook of Supply Chain Management*. Boca Raton, Fla.: The St. Lucie Press/APICS Series on Resource Management.
2. Bridgefield Group. (2006). Bridgefield group erp/Supply Chain (SC) glossary. [Online] <http://bridgefieldgroup.com/bridgefieldgroup/glos7.htm#P> (June 2, 2011).
3. Christopher, M., Magrill, L., Wills, G., 1998. Educational development for marketing logistics. *International Journal of Physical Distribution and Logistics Management* 28 (4), 234-241.
4. Cox, A. (1997). *Business Success*, Earlsgate Press, Boston, MA. CSCMP
5. Elcio M. Tachizawa, Cristina Giménez. 2009. Assessing the effectiveness of supply flexibility sources: an empirical research. *International Journal of Production Research* 47:20, 5791-5809
6. Elmuti, D. (2002). The perceived impact of supply chain management on organizational effectiveness and quality. *The Journal of Supply Chain Management* |Summer 2002, Summer 200(October). <https://doi.org/10.4271/2010-36-0173>
7. George, J and Pillai, V.M (2018) A Study on Factors affecting supply chain performance. *Journal of Physics: Conference Series*, Vol. 1355. International conference on Aerospace and Mechanical Engineering, 17-19 Dec, 2018TKM College of Engineering, Kerala, India. <https://doi.org/10.1088/1742-596/1355/1/012018>
8. Groosse, R. (2000). *Thunderbird on Global Business Strategy*, Wiley, New York, NY.
9. Gupta, S., & Palsule-Desai, O. D. (2011). Sustainable supply chain management: Review and research opportunities. *IIMB Management Review*, 23(4), 234-245. <https://doi.org/10.1016/j.iimb.2011.09.002>
10. Hazra, A. K. (2021b). RICE SUPPLY CHAIN AND RELEVANT ISSUES OF THE RICE MILLS: Production in Million Metric Tons. (IJEMMASSS), 03(03), 98-110.
11. Janvier-James, MBang Assey (2012). A New Introduction to Supply Chains & Supply Chain Management: Definitions and Theories Perspective, *International Business Research*, Vol 5, January, pp. 194-206, www.Ccsenet.org/ibr.
12. Kohli, A. S., & Jensen, J. B. (2010). Assessing Effectiveness of Supply Chain

Collaboration: An Empirical Study. *Supply Chain Forum: An International Journal*, 11(2), 2-16. <https://doi.org/10.1080/16258312.2010.11517228>

13. Lambert, D. M., & Cooper, M. C. (2000). Issues in Supply Chain Management. 83, 65-83.
14. Lu, L. X., & Swaminathan, J. M. (2015). Supply Chain Management. *International Encyclopedia of the Social & Behavioral Sciences: Second Edition*, December, 709-713. <https://doi.org/10.1016/B978-0-08-097086-8.73032-7>
15. New, S.J., Payne, P., 1995. Research frameworks in logistics: three models, seven dinners and a survey. *International Journal of Physical Distribution and Logistics Management* 25 (10), 60-77
16. Sharma, V., Giri, S., & Shankar Rai, S. (2013). Supply Chain Management Of Rice In India: A Rice Processing Company's Perspective. *International Journal of Managing Value and Supply Chains*, 4(1), 25-36. <https://doi.org/10.5121/ijmvsc.2013.4103>
17. Soosay, C. A., Hyland, P. W., & Ferrer, M. (2008). Supply chain collaboration: Capacities for continuous innovation. *Supply Chain Management: An International Journal*, 13(2), 160-169.
18. Stock, J. R., & Boyer, S. L. (2009). Developing a consensus definition of supply chain management: a qualitative study. <https://doi.org/10.1108/09600030910996323>
19. Tan, K. C. (2001). A framework of supply chain management literature. 7(February 1999).
20. Zamparini, L. (2010). Supply-chain management. *A Dictionary of Transport Analysis*, 385-386.