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EFFICIENCY PERFORMANCE OF FIRMS UNDER PHARMACEUTICAL AND HEALTHCARE ASSOCIATION OF THE PHILIPPINES (PHAP) 2010 TO 2014

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ABSTRACT

Pharmaceutical companies are expected to observe the highest ethical standard in the conduct of promotional activities to Healthcare Practitioners' (HCPs'). The increasing issue about ethical interactions needs to be understood in the light of its effect on the performance of the companies. This study aims to measure total productivity performance and efficiency of the 26 member-companies from Pharmaceutical and Healthcare Association of the Philippines who are mandated to observe ethical marketing standards, over the period of 2010-2014. This study utilized Data Envelopment Analysis (DEA)- Malmquist Productivity Index model and Slack-Based model in particular. The study used Cost of Good Sold (COGS) and Operating Expenses (OPEX) as input while Net sales and Gross Profit as output. Result shows that the geometric mean TFP score for the twenty-six (26) pharmaceutical firms is 0.979, which is below the best production frontier. With the two components of TFP, the decrease in mean score was due to the decline in technical efficiency change (0.972) while the mean technological change score is 1.007. Moreover, efficiency summary revealed that fifty-four percent (54%) of the sample firms were technically inefficient, twenty-three (23%) were weakly efficient and nineteen (19%) were strongly efficient. Findings in this study are valuable contribution to strengthen the industry and in its preparation for the adoption and implementation of Mexico City Principles (MCP), a voluntary codes of business ethics, in 2017.

Keywords: Efficiency, DEA, ethical marketing, Pharmaceutical

1.0 INTRODUCTION

Pharmaceutical companies are expected to observe the highest ethical standards when it comes to the interaction with Health Care Practitioners (Board, 2011), (Ahmad, Akhtar, Awan, & Murtaza, 2011), (Katz, Dana; Caplan, Arthur L.; Merz, Jon F.; 2010), and (Duque, 2008). Like any other businesses, they are meant to maximize profit. There is a need to increase the demand for their products and the best resource of the company to create this demand is its people, the so-called Professional Sales Representative. As "detailman" they are the ones with direct interactions with the Health Care Practitioners (HCPs) to bring knowledge or information of the products (PHAP Factbook, 2008).

There are existing laws that affect the pharmaceutical industry but, across the board there is no single implementing law that regulates ethical marketing from the government except one organization that upholds the professionalism and ethical standards for the members of the Pharmaceutical and Health-care Association of the Philippines (PHAP), (PHAP, Factbook 2008). PHAP is the first pharmaceutical organization in the country that has adopted the Code of Practice that is aligned with international codes like the Geneva-based International Federation of Pharmaceutical Manufacturers and Associations (IFPMA) Pharmaceutical Marketing Practices and the Mexico City Principles for Voluntary Codes of Ethics in the Biopharmaceutical Sector (PHAP Factbook, 2008). Because of this, there is an increasing issue about the ethical interactions between the Pharmaceutical companies and the HCPs, like the independent studies conducted by the companies for their own products that is quoted as "bias", as well as the prescription habit of HCPs is also affected by the gifts and hospitality given by these pharmaceuticals companies (Alkhaled, et al. 2014).This issue needs to be understood in the light of its effect on efficiency performance of the companies. Additionally, the practice among pharmaceutical companies has to be evaluated in relation to the efficiency performance after observing certain ethical standards.

2.0 THE RESEARCH MODEL

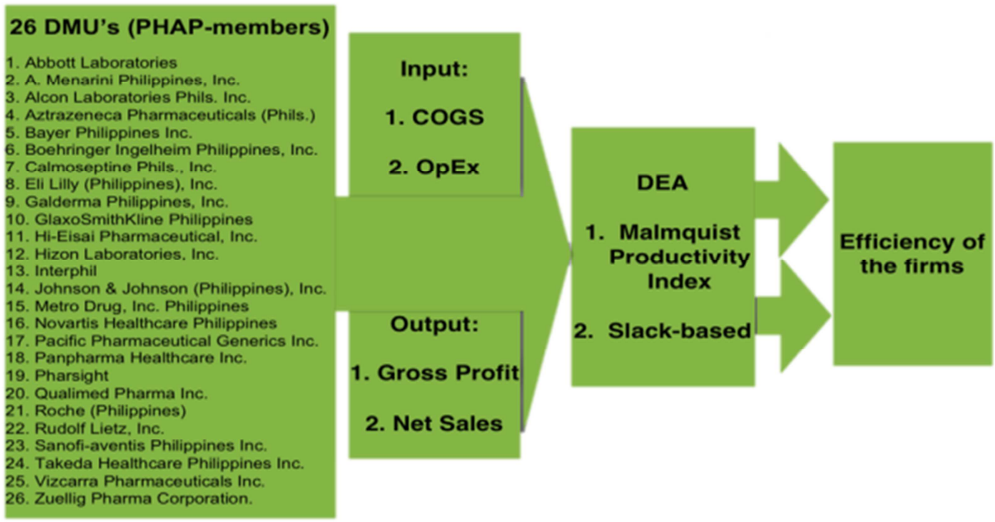

Figure 1. The Research Paradigm

3.0 METHODS

3.1 RESEARCH DESIGN

Primarily, this paper is a descriptive study, using quantitative approach. Descriptive research design is also necessary. Data Envelopment Analysis (DEA) was used to determine the efficiency of the twenty-six (26) member companies of the Pharmaceutical & Healthcare Association of the Philippines.

Total Factor Productivity (TFP) of the twenty-six (26) member companies were assessed over the time period 2010 to 2014. TFP was decomposed into two components: technical efficiency change and technological change to determine the productivity growth. It was evaluated using the DEA-Malmquist Productivity Index model (MPI). MPI was employed to evaluate the efficiency of the companies and provided a precise measure of productivity. The slack-based DEA, was used to identify the sources of efficiency and determined also how much of inputs should be minimized and how much of outputs should be maximized in order to reach the highest level of efficiency. Software used is DEAP version 2.1 developed by Tim Coelli of University of New England, Armidale, Australia.

4.0 RESULTS

4.1 EFFICIENCY RESULTS- MALMQUIST PRODUCTIVITY INDEX (MPI)

MPI was utilized to assess the productivity of the DMUs (pharmaceutical companies) observing ethical marketing practices in the Philippines. MPI showed the sources of productivity include overall efficiency and technical growth. This approach did not require production efficiency assumptions, rather, it identified the best practice pharmaceutical firms in every period. It represented efficient production frontier that measures pharmaceutical firms output relative to the frontier. Caves et al (1982) This presented the TFP of the Pharmaceutical industry under PHAP that was decomposed to TECHCH and EFFCH.

Objective 1.To evaluate productivity performance among the pharmaceutical companies over the period 2010 to 2014.

Table 2. Malmquist Index Summary of Firms Means (2010 – 2014)

Firms	EFFCH	TECHCH	TFPCH
A	0.917	1.055	0.967
B	0.985	1.009	0.994
C	0.996	1.024	1.020
D	0.988	1.047	1.034
E	0.981	1.031	1.011
F	0.944	1.038	0.980
G	1.007	1.037	1.044
H	0.808	0.828	0.669
I	0.930	1.017	0.947
J	0.919	1.047	0.962
K	1.028	0.913	0.939
L	1.010	1.016	1.025
M	0.944	0.996	0.940
N	0.973	1.114	1.085
O	1.000	0.965	0.965
P	0.994	1.016	1.010
Q	0.934	0.987	0.921
R	0.912	1.037	0.946
S	1.000	1.023	1.023
T	0.979	1.026	1.004
U	0.982	1.037	1.018
V	0.994	1.054	1.048
W	0.981	1.025	1.005
X	1.017	0.917	0.933
Y	1.039	1.055	1.096
Z	1.000	0.948	0.948
MEAN	**0.970**	**1.008**	**0.979**

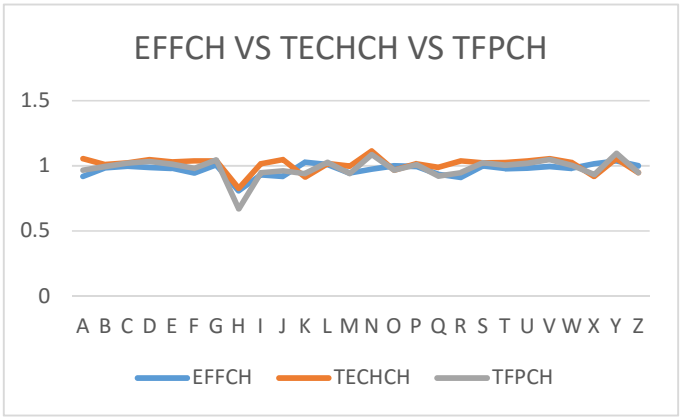

Figure 2. Line diagram of Table 2 Malmquist Index Summary

This table presents the Geometric mean of TFP and its components of the Pharmaceutical firms from 2010-2014. As seen in Table 5.1 the total factor productivity had obtained an average score of 0.979 over the test period. It reveals that over the study period the Thirteen (13) firms or Fifty percent (50%) are situated at the best practice frontier and displayed growth in TFPCH. These firms are C, D, E, G, L, N, P, S, T, U, V, W, and Y. This implies that the firms are able to adapt managerial and/or technological capabilities to achieve productive efficiency and growth. The other firms that situated below the efficient frontier are A, B, F, H, I, J, K, M, O, Q, R, X, and Z. This implies that fifty percent (50%) of the sample firms lacked the capability to adapt technological change and/or managerial efficiency change in the industry. Results show that technological change over the study period is the prime productivity factor among the firms.

H1: There is no difference in productivity performance among the selected PHAP-members. (Rejected)
H2: The observance of ethical marketing practices has no significant impact on companies' efficiency and productivity performance. (Rejected)
H3: The company's observance of ethical practices will not lead to efficiency gains (Rejected)

4.2 PERFORMANCE RANKING OF FIRMS

DEA- MPI assimilates all the DMUs to the benchmark or the identified most efficient DMU(s) in the sample and calculate only one index of productivity. Through DEA, operational managers can use of the most efficient DMU(s) to assess other DMUs. With the given set of variables, DEA permits analyst to calculate the best performing unit equated with the others in the sample. Pharmaceutical companies observing ethical marketing relative efficiency scores indicates that the total factor productivity is below the optimal scale. Technical efficiency change, one of the components of TFP, contributed to the inefficiency of the sample firms as the measures below the efficient frontier with the score of 0.972.

Objective 2. Identify the best performers among the PHAP member-companies in terms of technical efficiency and productivity

Table 3. Comparative Performance Ranking of Pharmaceutical Firms using TFP Score and Its Components (EFFCH and TECHCH from 2010-2014)

FIRMS	Rank	TFP	Rank	EFFCH	Rank	TECHCH
Y	1	1.096	1	1.039	2	1.055
N	2	1.085	14	0.973	1	1.114
V	3	1.048	8	0.994	3	1.054
G	4	1.044	5	1.007	6	1.037
D	5	1.034	9	0.988	4	1.047
L	6	1.025	4	1.010	14	1.016
S	7	1.023	6	1.000	11	1.023
C	8	1.020	7	0.996	10	1.024
U	9	1.018	11	0.982	6	1.037
E	10	1.011	12	0.981	7	1.031
P	11	1.010	9	0.994	14	1.016
W	12	1.005	12	0.981	9	1.025
T	13	1.004	13	0.979	8	1.026
B	14	0.994	10	0.985	15	1.009
F	15	0.980	15	0.944	5	1.038
A	16	0.967	19	0.917	4	1.047
O	17	0.965	6	1.000	18	0.965
J	18	0.962	18	0.919	4	1.047
Z	19	0.948	6	1.000	19	0.948
I	20	0.947	17	0.930	13	1.017
R	21	0.946	21	0.912	6	1.037
M	22	0.940	15	0.944	16	0.996
K	23	0.939	2	1.028	21	0.889
Q	24	0.933	3	1.017	20	0.917
X	25	0.921	16	0.934	17	0.987
H	26	0.669	22	0.808	22	0.827

This table presents the comparative performance ranking of pharmaceutical firms using their TFP score and its components EFFCH and TECHCH. The empirical results as shown above reveal that in terms of total factor productivity, Firm Y leads the pharmaceutical companies, with a score of 1.096. Second was Firm N (1.085), then followed by Firms V (1.048), G (1.044), D (1.034), L (1.025), S (1.023), C (1.020), U (1.018) and on the tenth place E (1.011)

For technical efficiency change, Firms Y, K, X, L, G, S, and O are relatively the most efficient at converting their resources to achieve technical efficiency (managerial efficiency). These firms on the efficient frontier are good in catching-up to the frontier due to better utilization and maximization of their given resources. The rest of the pharmaceutical firms fall below the efficient frontier but it was only Firm H that had an EFFCH score below 80 percent.

With regards to technological change or innovation, Firm N was ranks 1 in all the sample firms with the score of 1.114. This is followed by Firms Y (1.055), V (1.054), D (1.047), A (1.047), F (1.038), G (1.037), U (1.037), R (1.037), E (1.031), T (1.026), W (1.025), C (1.024), S (1.023), I (1.017), L (1.016), and B (1.009). The rest of the firms fell below the best practice frontier. Firm H occupies the lowest rank, with a score of (0.827).

It should be noted that a firm may not be the most efficient on both measures of performance of technical and technological efficiency. Over the study period, Firms K and X are efficient only with respect to technical efficiency (EFFCH) but not with technology (TECHCH).On the other hand, Firms N, V, D, J, A, F, U, R, E, T, W, C, I, P, and B were efficient only with respect to technology (TECHCH) but not with technical or managerial efficiency (EFFCH). Firms M, Q, and H were inefficient both with respect to technology and managerial efficiency. Finally, Firms Y, L, G, and S were "super performers" as they situated on the efficiency frontier for both performance measurements of technical efficiency and technology. This implies that these firms are competing both on technological advantage and technical efficiency advantage in the sample firms.

H1: There is no difference in productivity performance among the selected PHAP-members. (Rejected)
H2: The observance of ethical marketing practices has no significant impact on companies' efficiency and productivity performance. (Rejected)
H3: The Company's observance of ethical practices will not lead to efficiency gains. (Rejected)

4.3 SLACKS

This part of the chapter evaluates slacks of the pharmaceutical firms under the PHAP. Over the study period, slack values were considered to measure input excess and output shortage each company incurred that have caused inefficiency. According to Coeli (1998) a firm can only be technically efficient if it operates on the frontier, and furthermore, slack is equivalent or equal to zero.

Table 4 Summary of Input and Output Slacks, in Millions

FIRMS	COGS	OPEX	NET	GROSS
A	0.000	0.000	0.000	0.000
B	0.000	0.000	0.000	0.000
C	0.000	0.000	0.000	0.000
D	0.000	0.000	0.000	173.520
E	0.000	0.000	0.000	50.263
F	0.000	0.000	0.000	0.000
G	0.000	0.000	0.000	0.000
H	0.000	0.000	0.000	0.000
I	0.000	0.000	0.000	0.000
J	0.000	0.000	0.000	0.000
K	0.000	0.000	223.031	0.000
L	0.000	0.000	0.000	0.000
M	0.000	0.000	0.000	0.000
N	0.000	0.000	0.000	0.000
O	0.000	0.000	0.000	0.000
P	0.000	0.000	0.000	186.093
O	0.000	0.000	0.000	0.000
R	0.000	0.000	0.000	0.000
S	0.000	0.000	0.000	0.000
T	0.000	0.000	0.000	0.000
U	0.000	0.000	0.000	0.000
V	0.000	0.000	0.000	0.000
W	0.000	175.769	0.000	198.777
X	0.000	0.000	2.955	0.000
Y	0.000	0.000	0.000	0.000
Z	0.000	0.000	0.000	0.000
MEAN	**0.000**	**6.760**	**8.692**	**23.410**

Objective 3. To examine and compare slacks over the study period

Over the study period, the Pharmaceutical Companies under PHAP revealed input slacks mean of 6.760 under operating expense and an output slacks mean of 8.692 and 23.410 under net sales and gross profit respectively.

This table shows the summary of input slacks (excess) with DEA-VRS of pharmaceutical sample for the study period. The above figures imply that Firm W have excessed by 175.769 (in millions) on its operating expenses. This implies that Firm W is not using its input resources properly when compared to its relative outputs.

This table shows the summary of output slacks (shortage) with DEA-VRS of pharmaceutical sample for the study period. The above figures imply that Firm D, E, P, and W had shortage (in millions) by 173.520, 50.263, 186.093 and 198.777 respectively, on its gross profit while Firm K and X had shortage (in millions) in net sales by 223.031 and 2.955 respectively. This implies that these Firms need to enhance their available resources like effective marketing strategies and selling skills in order to produce the shortage in relative outputs (net sales, gross profit) despite that these firms are observing ethical marketing.

H4: There are no slacks in input and output among the selected PHAP-members. (Rejected)

5.0 CONCLUSIONS

The result showed that the total factor productivity of the industry is below the optimal scale. Only technical change or managerial efficiency contributed to the inefficiency of the samples as only EFFC fell below the efficient frontier while TECH lies in the efficient frontier over the test period. Firms are challenged to simultaneously learn how to exploit their current resources to execute ethical marketing activities to achieve their maximum output in the industry. This is critical to both the short-term and long-term competitiveness of the firm especially to the new firms in the industry since they must continually build focus, develop and sell products that address particular needs of the customer for the benefits of the patients. Among the studied firms in this research, the management of Firm W needed a review on the usage of identified input resources to minimize input slacks in their operation. In order to be at par with the major firms in the industry, the management of the company must utilize and manage their input resources well. This study provides values for input reduction that can serve as guide to set efficiency targets by regulators of the company.

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