Evaluation of Pharmaceutical Companies in Second Bourse Market Using Data Envelopment Analysis (DEA)

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ABSTRACT

One of the ways of creating and continuing improvement in organizations is to use operation evaluation. The organizations' operation level will be revealed by operation evaluation therefore the management of these organizations can use the data and their analysis. It is tried in this article that using DEA logic and determining input and outputs which show operation level, the pharmaceutical companies of a Bourse market have been operationally monitored. This operation evaluation approach leads to distinguish the weaknesses and strengths of each pharmaceutical company and those companies can use a better strategy in order to have a continues improvement.

KEYWORDS: operation evaluation, data envelopment analysis (DEA), pharmaceutical companies, financial bills.

1. INTRODUCTION

Mahmoud Abadi and Ghayoori Moghaddam (2011) were among the only 18 companies in functional credit status among 128 accepted companies in Bourse in a research entitling "Affordability of Primary and Secondary of Debts Credit Ranking" which used input-based BBC pattern approach.

Mohammadi Garmfi (2006) in his "DEA based on total Ownership Costs for Choosing Providers" evaluated 15 hypothetical companies.

Therefore, three pharmaceutical companies of first bourse market of Jaber-ibn-Hayyan, Kosar and Kimidarou were evaluated using DEA. Human resources, inputs, debt, capital and output, net profit, and the number of produced goods are considered in this model. While the scale of produced goods is less than the other output meaning net profit, it has become similar using interpolation of scales in order to have a realer model answer.

2. MATHEMATICAL MODEL

Jaber-ibn-hayyan Company
```
max=68906*u1+90000*u2;
1093372*v1+378000*v2+532*v3=1;

68906*u1+90000*u2<=1093372*v1+378000*v2+532*v3;
114709*u1+50000*u2<=418995*v1+180000*v2+165*v3;
330910*u1+60000*u2<=585291*v1+240000*v2+416*v3;
v1>=0;
v2>=0;
v3>=0;
u1>=0;
u2>=0;
end
```
Global optimal solution found.
Objective value: 0.8571429
Infeasibilities: 0.000000
Total solver iterations: 3

Variable	Value	Reduced Cost
U1	0.000000	137570.2
U2	0.9523810E-05	0.000000
V1	0.000000	182985.0
V2	0.2645503E-05	0.000000
V3	0.000000	159.0000

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Row	Slack or Surplus	Dual Price
1	0.8571429	1.000000
2	0.000000	0.8571429
3	0.1428571	0.000000
4	0.000000	1.800000
5	0.6349206E-01	0.000000
6	0.000000	0.000000
7	0.2645503E-05	0.000000
8	0.000000	0.000000
9	0.000000	0.000000
10	0.9523810E-05	0.000000

Kowsar Company
```
max=114709*u1+50000*u2;
418995*v1+180000*v2+165*v3=1;
68906*u1+90000*u2<=1093372*v1+378000*v2+532*v3;
114709*u1+50000*u2<=418995*v1+180000*v2+165*v3;
330910*u1+60000*u2<=585291*v1+240000*v2+416*v3;
v1>=0;
v2>=0;
v3>=0;
u1>=0;
u2>=0;
end
```
Global optimal solution found.
Objective value: 1.000000
Infeasibilities: 0.000000
Total solver iterations: 4

Variable	Value	Reduced Cost
U1	0.1018800E-05	0.000000
U2	0.1766269E-04	0.000000
V1	0.2386663E-05	0.000000
V2	0.000000	0.000000
V3	0.000000	0.000000

Row	Slack or Surplus	Dual Price
1	1.000000	1.000000
2	0.000000	1.000000
3	0.9496674	0.000000
4	0.000000	1.000000
5	0.000000	0.000000
6	0.2386663E-05	0.000000
7	0.000000	0.000000
8	0.000000	0.000000
9	0.1018800E-05	0.000000
10	0.1766269E-04	0.000000

Kimidarou Company
```
max=330910*u1+60000*u2;
585291*v1+240000*v2+416*v3=1;
68906*u1+90000*u2<=1093372*v1+378000*v2+532*v3;
114709*u1+50000*u2<=418995*v1+180000*v2+165*v3;
330910*u1+60000*u2<=585291*v1+240000*v2+416*v3;
v1>=0;
v2>=0;
v3>=0;
u1>=0;
u2>=0;
end
```
 Global optimal solution found.
 Objective value: 1.000000
 Infeasibilities: 0.000000
 Total solver iterations: 5

Variable Value Reduced Cost

U1	0.3021970E-05	0.000000
U2	0.000000	0.000000
V1	0.000000	0.000000
V2	0.000000	0.000000
V3	0.2403846E-02	0.000000

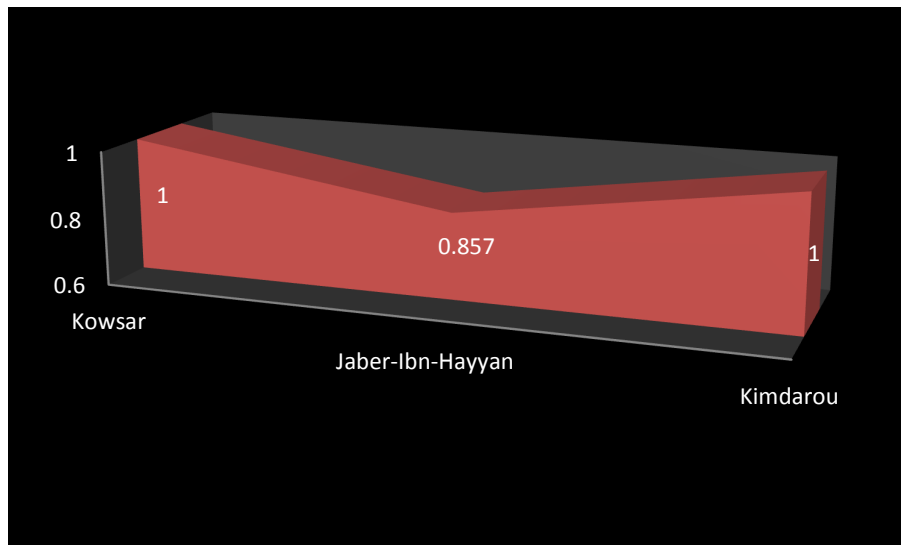| Row	Slack or Surplus	Dual Price
1	1.000000	1.000000
2	0.000000	1.000000
3	1.070614	0.000000
4	0.4998749E-01	0.000000
5	0.000000	1.000000
6	0.000000	0.000000
7	0.000000	0.000000
8	0.2403846E-02	0.000000
9	0.3021970E-05	0.000000
10	0.000000	0.000000

Fig.1. pharmaceutical companies operation

3. CONCLUSION

As it has stated in the previous parts, one of the aims of organizations is direction orientation due to continue improvement. In order to this, the organizations' status must become obvious in comparison with the competitors. Therefore, in this model using DEA method, and determining two outputs and three inputs, first bourse market pharmaceutical companies have been monitored, evaluated and compared.

REFERENCES

1) Mahmoud Abadi and Ghayoori Moghaddam "Affordability of Primary and Secondary of Debts Credit Ranking" Accounting Magazine, Spring, second year, no 4, (2011)
2) Mohammady Garmafy, Reza, A data envelopment analysis approach based on total cost of ownership for supplier selection, journal of enterprise information management, vol 19, Iss:6pp, (2006)