

Full Length Research Paper

Evaluation and analysis on profitability – Efficiency in hospitals affiliated with the ministry of health

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Measuring performances of the hospitals under Ministry of Health is a must for the efficient use of the resources. To serve this purpose, data envelopment analysis, capable of measuring relative effectiveness of decision units by processing more than one input and output, has been used. By means of data envelopment analysis technique, we have aimed to use the resources efficiently. For this reason, the model has been run input oriented. With the study, effectiveness and profitability measurements were performed in the hospitals under Ministry of Health. For this purpose, by using 2007 data on 5 financial inputs and 1 financial output variables from 16 different hospitals, effectiveness measurement was carried out and profit/loss values of the units were evaluated. According to the results obtained improvement for each unit is described and effects on their profitability are also stated. Considering the profit / loss values of the hospitals, it is concluded that they should cut their expenses at the rate of 10, 43% in order to reach break-even point regarding profit and loss balance.

Key words: Data envelopment analysis, hospitals, performance measurement, financial evaluation.

INTRODUCTION

Health is considered one of the most important factors in the societies of global economy. Evaluated from the point of the society, enhancing the social level of health is of great essence in economic and social terms to lead a productive life. Hence, great amounts are allocated from public funds and budget for the health sector. This being the case, the importance of the efficiency of health-related services is on the increase for people, owing to ever-increasing costs in health services (Ramanathan, 2005: 39 to 54).

Hospitals are allocated the major portion of the public funds. Hospitals are the very basic units offering health service to all walks of life. To date, hospitals have begun to operate as profit-organization in line with the global

competition, increased patient expectations, quality, changes in profit / cost and technological developments as well as offering services for protective health and treatment (Godiwalla, et al., 1997: 202 to 207).

Health care services are the services offered by managements of different types. Among these, hospitals are of great importance since management of hospital covers a vast array of services. In this sense, the question of cost efficiency comes into mind, for the budget allocated for health care services, in this context hospitals, have really become a burden for the state economy. Hospitals, are the kind of organizations which have to operate nearly at a zero deficit and nearly no service-impairment. The reason for this lies in the fact that any performance-impairment or low service is likely to lead to irreversible mistakes, such as death and life-long injuries. This being the case, the concept of quality is hard to define in precise terms in health services. Whatever the case is, one another objective of hospitals

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is to make their activities go on despite the hardships of any kinds, like other organizations. For this reason, hospitals are in a position to make use of their resources in an effective and efficient manner in order to survive as well as delivering high quality health-care services. Hence, efficiency and profitability studies are a must for hospitals, which is the main objective of this paper.

Documenting a brief literature on the concepts of performance and performance measurement methods, this paper goes on with a brief literature on data envelopment analysis. The study subsequently accommodates the purpose and the scope of the study. The measuring method and data set have been mentioned and analysis and findings assessed.

CONCEPT OF PERFORMANCE AND ITS MEASUREMENT

Performance is an important issue in the eye of managers and is a result of employee behavior. In the literature, there is no universally accepted definition; however, by some scholars in the field, performance was defined as the followings: (Gencer, 2006: 6). In the 16th century, performance was used in the sense of achieving the military orders and tasks, which is quite different from the sense it is used today (Lawson, 1995:3). Nowadays, performance is defined as the points reached via the plans towards specific objectives (Gencer, 2006: 6). According to another definition, performance is the level of achievement of a given task or behavior of employees towards a task. Bingöl defines the term "performance" as the output that a person or worker has after carrying out the task assigned within a definite time period (Bingöl, 2003: 272).

The performance is the term used to mean how much and what a group of workers or an organization could achieve its goals both quantitatively and qualitatively (Baş, 1991: 13). In other words, it is a measurement by which we define the achievement both in quality and quantity (Sungur, 1995: 1). In brief, it is the evaluation in the achievement of the goals. It can be evaluated both totally and partially. It is the rate of how much produced according to the goals of a production unit or an organization. According to another definition, this term explains what a person, group or an organization have achieved in accordance with the goals, or what they produced in quantity and quality (Akal, 1992: 6).

However, Berkay (2002: 26 to 27), defines the term through an idea of organizations by productive persons so as to achieve economic advantages. A body of business consists of workers, management, entrepreneurship ability, capital and so on. They use these components to appraise, and each of these components has a value they are expected to have. Reaching a conclusion through these ideas, organizational performance can be defined as the

equivalence and gain between economical value achieved by using above mentioned components and the expected value that each shareholder expects to get. If the gap between what has been achieved and what people expected is bigger, the investor may lead to alternative resources with which he can achieve more than now.

Performance in the business culture is defined as the level any working organization has achieved according to their goals at a specific work. In other words, it defines what has been provided in quantity and quality again, or it the evaluation of all efforts spent for the sake of organization's or business' goal (Kenger, 2001: 38).

According to the organizations or businesses, performance is appreciation. It can be achieved both by doing the correct work (strategy) and in a proper way (Total quality management), a term rephrased as the quality in functionality. In the early years of 20th century, the concern about this term increased continuously after what Taylor did to measure the productivity (Pervaiz et al., 1999: 305).

The goal and purpose of an organization is to achieve a certain task. The role of the management is to take necessary precautions so as to reach the goals and purpose. How the managements understand the performance and criteria has changed from what they were at the beginning. The only aspect of performance that has not changed so far is being economic. Either private or state, and either having function in production sector or service one, each is in a competition to survive to obtain profit, and thus being economic. Profit and profitability are essential for both the community and the business itself. Not only does a business obtain profit, but it can serve the community as well. Thanks to economical resources, the appreciation of the business in every community forms the main resource for service delivery (Gencer, 2006: 7). Productivity is the second aspect in the explanation of the performance. The condition in which demand for the goods and services, and scarce resources were experienced after the World War II brought about this term like a savior. It made all the effort that the manager spends focus on benefiting from all inputs and resources. The productivity has changed its focus from labour and stuff which were used in production to capital and energy resources (Halis and Tekinkuş, 2003:170 - 171). Business performance, in a wide spectrum, was first introduced as the term looking for a solution for the questions highlighted thus (Gencer, 2006: 8):

- 1) Where are we now?
- 2) How well can we be more?
- 3) Where should we be now?

These three basic questions explains what business performance means. These questions determine the definition and evaluation of performance in this field.

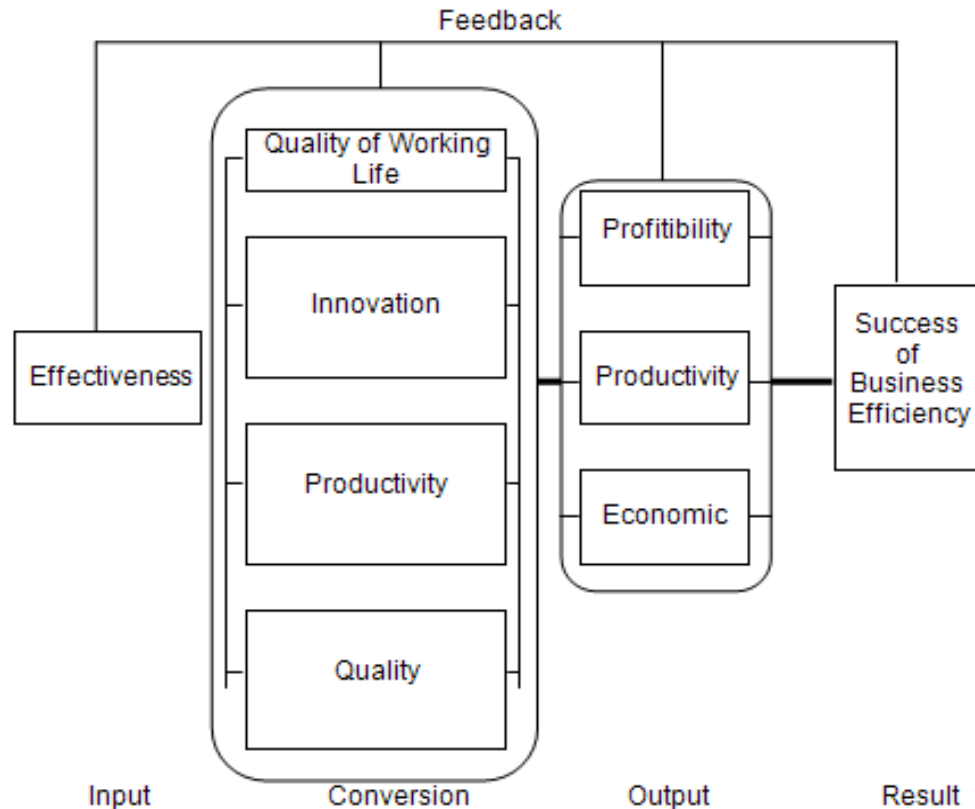


Figure 1. Performance dimensions and relations (Dasdemir, 1995).

They also form the overall framework for improvement of performance in businesses. Within organizational bodies, the ideas of the management about performance fields and aspects change constantly. There happen new ideas defining the term. At the beginning of industrial revolution, these aspects were defined as cost-benefit. In time, productivity, and later on quality and customer satisfaction were added to these aspects. Nowadays, worker's behavior, market, product's pioneering role, public responsibility is involved. In the classification made during the last process, performance within the organization is recognized through the aspects highlighted thus (Kenger, 2001:39 to 43): 1) effectiveness; 2) efficiency; 3) productivity; 4) economic; 5) quality; 6) quality of working life; 7) innovation; 8) rantability, profitability, Figure 1 shows the relationships in the dimension and performance.

MATERIALS AND METHODS

Data envelopment analysis (dea) and its evaluation

DEA and data envelopment analysis, as seen in Figure 2, presents an alternative means to get information about the experimental group. DEA, in contrast to parametric methods whose goal is to optimize regression line through the data collected, uses each experiment in the most appropriate way to determine the edge that

is defined with the decision-group of pareto - productive units method / means. The data of each experiment is used both in parametric and non-parametric methods. In analysis of parametric, it is approved that every single regression equation can be applied to each decision unit. In contrast to that, DEA evaluates each decision group's performance measurement adequately. This is done to avoid exemplifying an average imaginary group and it is a general comprehension of every group. In other words, DEA focuses on experiments done by optimizations that are essential, rather than focusing on averages and predictions related to sole optimization of statistical approaches (Güçlü, 1999: 16).

Parametric approach requires a specific function (like regression equation and production function) format that will correlate the independent variables to dependent variables, but it doesn't require the factors including the marginal production value of these variables, and considerations about the error terms and other limitations. DEA determines the highest point of production for the decision units that are related to other units in the main group which may be under or over the limits. Each of the decision units under the limitations is determined according to the decision unit at the closest productivity level (Güçlü, 1999: 17).

DEA empirically brings about a maximum production level (figure 2, the single line), and that gives the maximum production achieved at the input level with an empirical means by a decision group in a population in which the highest level of production is handled economically (Güçlü, 1999: 17).

DEA evaluates both the input and the output observations, and includes many performance measurements at the same time. It puts forward the best performance of a unit in accordance with the similar performances of units with similar features (Boles et al., 1995: 36).

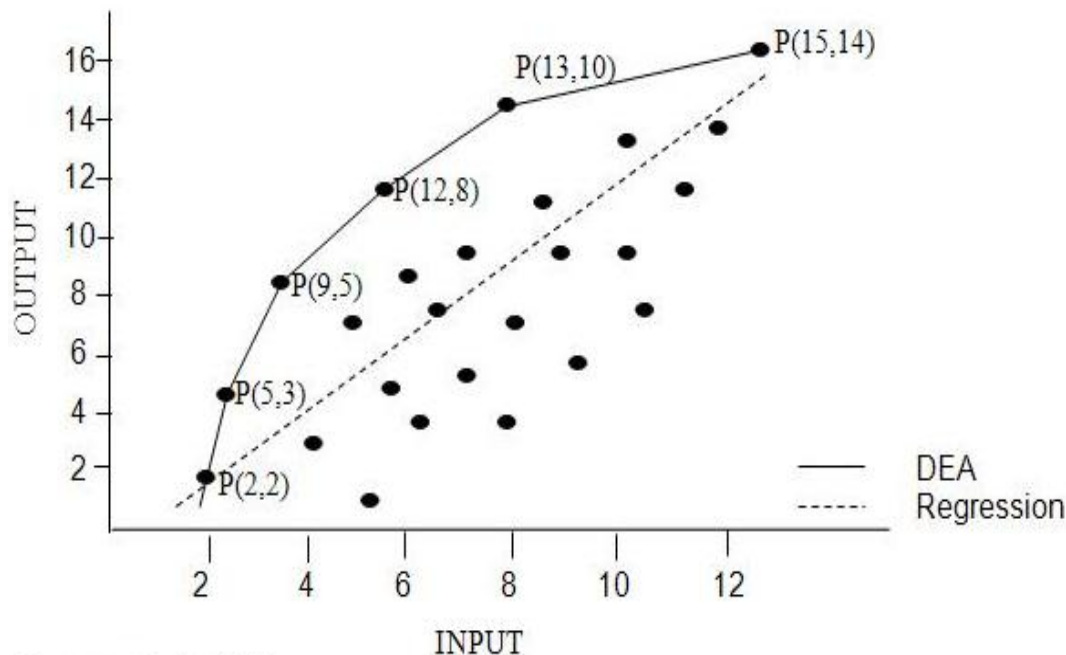


Figure 2. Comparison of data envelopment analysis and regression analysis (Guclu, 1999).

DEA does not only show the least or the most efficient units, but also gives the means of efficient use of time and as high level of output as possible. Then, it has an efficient unit for those that are not as much efficient as the previous ones. Relatively, these units which are referred to, have similar input and output combination, and they are exemplified for the better performance of the inefficient unit. In addition, DEA, in real situations and applications, set the goals for the units which are relatively below the expected efficiency. Then, these goals help the unit with self-observation and comparison between the others. All the DEA actions puts a relatively efficient unit forward from the input and output groups, and make all the input and outputs of each unit be the goals (Boussofianne et al., 1991: 1 to 10).

DEA is an effective method for evaluating the decision units, and the way it gets the information in the process is not costly and easier than any other methods (Homburg, 2001: 51). The three fundamental weaknesses of DEA are that it ignores important variables and the effects of outliers and insufficient observations. These may result in miscalculations in the value of efficiency, and change comparison values (Tepe, 2006: 65). DEA uses only the inputs and outputs to measure the level of efficiency. Therefore, to have a meaningful analysis, the inputs and outputs have vital roles. Excluding some variables in some circumstances may lead to a different analysis compared to the vice versa. One of the important concerns that should be taken into account while using DEA in comparison is that DEA is very susceptible to outlier values. The unit with the outlier values increases the level, and thus leaving the previous ones that are over the limit under the efficiency level. Though this is a limitation in DEA, it is useful to decide on an efficient unit from a group including many other units. Any units with outlier values, exceptionally, can cause a single and efficient unit after increasing the level and eliminating all others. Ignoring the insufficient observations in DEA may not be as important as that of outlier values, but involving as many decision units in analysis as possible can give accurate results (Donthu et al., 2005: 1474 to 1482). The strong and weak aspects of DEA can be listed as the followings (Aydemir, 2002):

Strong aspects

1. DEA defines, rather than a sole means, but alternative means to increase the performance of unproductive decision units by comparing its performance with those whose performance is relatively higher. Choosing the appropriate one for the unit is related to opinion and experience of the decision makers.
2. The implementation of DEA helps the decision makers to identify the production process and all inputs and outputs.
3. It is possible to have a database through the DEA work, and thus, better documenting.
4. DEA accepts the input and output data as an end-product of a deterministic process, but not a random one. Therefore, it is used as a more efficient method of analysis which doesn't require the data to be non-parametric and to overlap a certain functional range for the conditions that are deterministic.
5. Instead of the function presented by any statistical forecasting methods, since the efficiency analysis is done according to limitations function the best observations, the goals are defined under the exemplifications of the most efficient units. This, therefore, strengthens the accuracy and validity of the efficiency analysis done by the DEA.

Weak aspects:

1. As DEA is tested only through physical inputs and outputs, it is limited to technical input and output productivity. It can be improved, if possible, by increasing input and output cost or the quantity.
2. Qualitative input and output results may interfere with the results. Involvement of the input and outputs mentioned has a vital role for the method to give better results. When a crucial input or output isn't involved in the process, the results may be misleading and biased.
3. The difference between the observed performance and the best is attributed to unproductivity, and measurement errors the highest observation points are discounted in DEA.

4. DEA methods are static and evaluated in a single time period. However, as it takes more than a single time period for decision units to process inputs and produce outputs, production process requires dynamic features. Therefore, it will be necessary for the data within other periods to have appropriate induction rate.

5. As decision making units don't have superiority over other units in the group, it is getting more possible to evaluate the productivity level of these units. Therefore, DEA efficiency results should be limited to and evaluated as part of relativity.

THE PURPOSE AND SCOPE OF THE STUDY

The purpose of this study is to compare the financial efficiency of state hospitals according to 'the most efficient, efficient, and not efficient', and then to identify the "inefficient" ones; to determine the quantity of amendments to improve them; to put forward the profitability and correlation between efficiency and profitability.

The study was carried out in 16 hospitals located in different cities and having the same information sets (having the same input and outputs). They were randomly chosen, and those with the accurate information sets were involved in the study.

In the study, "input oriented data envelopment analysis" was implemented as the method for efficiency measurement. This method has been determined as the hospitals have more control on output rather than inputs. Although, DEA has some weaknesses, in areas where there are many inputs and output used, the data used with mathematical programming techniques is converted to meaningful information sets. This brings about more accurate results than others that played an important role in choosing it. In the study, 'profitability' was measured in proportion to the decision unit's profit/income.

THE DATA SET AND ITS SCOPE

The data used in the study was received from the Department of Performance Management and Quality Improvement under the Ministry of Health. The data covers 2007 and 16 State hospitals:

1. Adana State Hospital
2. Afyon State Hospital
3. Ankara Training and Research Hospital
4. Ankara Yüksek İhtisas Training and Research Hospital
5. Balıkesir State Hospital
6. Çanakkale State Hospital
7. Elazığ Training and Research Hospital
8. Gaziantep Av. Cengiz Gökçek State Hospital
9. Isparta Eğirdir Bone Diseases Hospital
10. İzmir Dr. Suat Seren Chest Diseases and Chest Surgery Training and Research Hospital
11. İzmir Karşıyaka State Hospital
12. Konya Numune Hospital
13. Malatya State Hospital
14. Muş State Hospital
15. Muş Maternity and Pediatric Hospital
16. Tokat Vali Recep Yazıcıoğlu State Hospital

The relative efficiency of the hospitals was measured and their profitability was put forward. The data set of the study comprises of 6 variables, 5 inputs and 1 output. The input variables are as highlighted thus:

1. Direct raw materials and supplies
2. Personnel wages and expenses
3. Outsourced benefits and services
4. Other expenses
5. Amortization and depletion

Output variable is "service income"

Direct raw materials and supplies:

The contents of this item are highlighted thus: 1) stationery expenses; 2) food and beverage expenses; 3) medical and laboratory material expenses; 4) cleaning stuff expenses; 5) clothing and fabrics expenses; 6) repair, maintenance and spare parts expenses; 7) raw material expenses; 8) other expenses.

Personnel wage and expenses:

The contents are: 1) basic wages; 2) extra payments; 3) extra-work payments; 4) health and social benefits; 5) allowances; 6) other expenses.

Outsourced benefits and services:

The contents are highlighted thus: 1) electricity, water and heating expenses; 2) communications expenses; 3) maintenance expenses; 4) outsourced personnel expenses; 5) outsourced service expenses; 6) counselling services expenses; 7) other outsourced benefit and service expenses.

Other expenses:

The contents are highlighted thus: 1) insurance expenses; 2) marketing and advertising expenses; 3) rent expenses; 4) social expenses; 5) education and cultural expenses; 6) accommodation and travel expenses; 7) mutual expenses; 8) court and legal expenses; 9) taxes and legal fees; 10) public shares; 11) other expenses.

Amortization and depletion:

The contents are as enumerated thus: 1) assets amortization expenses; 2) intangible asset amortization expenses; 3) specific assets and amortization expenses; 4) other amortizations and depletion expenses.

"Service incomes" used as output variables are: 1) polyclinic incomes; 2) clinic incomes (bed incomes); 3) intensive care unit incomes; 4) surgery incomes; 5) birth incomes; 6) medicine incomes; 7) medical material incomes; 8) blood and blood-derivative incomes; 9) dialysis incomes; 10) radiology and laboratory incomes; 11) board of health and medical report incomes; 12) other incomes.

In order to perform Data Envelopment Analysis (EMS) efficiency measurement system was employed. The software can be run under Microsoft excel. Hence, the data sets were first prepared with MS Excel and then transferred to EMS software. Besides being different from the previous studies with DEA, the super-efficiency model was activated and efficient units were sorted.

RESULTS

DEA has been conducted for the 16 decision making units; their levels of profitability have been identified and the results are presented in Table 1.

In Table 1, hospitals are ranked according to their efficiency levels. As is shown in the table, 5 of the 16 hospitals (31, 3%) have been found to be efficient (the grey-highlighted part/ the hospitals with an efficiency level of 100% and above) and 11 (68, 7%) to be inefficient.

Table 1. Efficiency and profitability table for hospitals.

Decision making units	Value of efficiency (%)	Profitability / Unprofitability (%)
Ankara Yüksek İhtisas Training and Research Hospital	272.58	-31.63
Çanakkale State Hospital	184.04	45.47
Malatya State Hospital	147.65	-15.60
Gaziantep Av. Cengiz Gökçek State Hospital	142.17	8.95
Isparta Eğirdir Bone Diseases Hospital	122.91	-28.94
Elazığ Training and Research Hospital	85.85	-29.82
İzmir Karşıyaka State Hospital	85.59	-37.26
Adana State Hospital	83.53	14.66
Balıkesir State Hospital	79.74	-9.32
Ankara Training and Research Hospital	74.76	-21.47
Tokat Vali Recep Yazıcıoğlu State Hospital	74.05	-29.76
Afyon State Hospital	73.46	3.54
Muş State Hospital	71.89	-11.72
Konya Numune Hospital	69.74	-52.60
Muş Maternity and Pediatric Hospital	59.31	-15.29
İzmir Dr. Suat Seren Chest Diseases and Chest Surgery Training and Research Hospital	53.57	-27.61

Table 2. Improvement table for the inefficient hospitals (%).

Decision making units	Direct raw materials and supplies	Expenses for personnel and wages	Outsourced benefits and services	Other expenses	Amortization and depletion
Elazığ training and research hospital	50.18	10.88	29.67	0.00	0.00
İzmir Karşıyaka state hospital	22.15	37.38	64.87	0.00	0.00
Adana state hospital	0.00	17.35	37.15	12.76	0.00
Balıkesir state hospital	0.00	30.13	45.08	0.00	19.61
Ankara training and research hospital	0.00	20.51	0.00	22.63	67.30
Tokat Vali recep yazıcıoğlu state hospital	0.00	7.70	16.16	0.00	49.95
Afyon state hospital	5.02	0.00	34.20	9.38	0.00
Muş state hospital	0.00	18.69	37.48	17.21	0.00
Konya Numune hospital	0.00	27.69	8.50	0.00	39.29
Muş maternity and pediatric hospital	9.46	0.00	31.97	0.00	31.03
Izmir Dr. Suat Seren chest diseases and chest surgery training and research hospital	5.57	0.00	28.74	0.00	32.54

Ankara Yüksek İhtisas Training and Research Hospital is a super efficient hospital; however, it turned out to be unprofitable. The hospitals that are both efficient and profitable, namely Çanakkale state hospital and Gaziantep Av. Cengiz Gökçek State Hospital, have turned out to be profitable although, not efficient.

The amount of input improvement (reduction) that the inefficient hospitals should undergo in order to become

efficient is given in Table 2. According to Table 2, if Elazığ Training and Research Hospital reduces the expenses for direct raw materials and supplies by 50.18%. Wages and Personnel Expenses by 10.88% and the expenses for outsourced benefits and services by 29.67%, it should become efficient. While the unprofitability level of the unit is now -37.26%, its profitability level will reach up to 1% if it becomes

efficient.

İzmir Karşıyaka State Hospital should become efficient if it reduces the expenses for direct raw materials and supplies by 22.15%, Wages and Personnel Expenses by 37.38% and the expenses for outsourced benefits and services by 64.87%. While the unprofitability level of the unit is -37.26%, its profitability level will reach up to 31% if it becomes efficient.

Adana State Hospital will become efficient; if it reduces Wages and Personnel Expenses by 17.35% the expenses for outsourced benefits and services by 12, and 76%. While the unprofitability level of the unit is, its profitability level will reach up to 31% if it becomes efficient.

Balıkesir state hospital will become efficient; if it reduces Wages and Personnel Expenses by 30, 13%, the expenses for outsourced benefits and services by 45, 08% and amortization and depletion by 19.61%. While the unprofitability level of the unit is -9.32% its profitability level will reach up to 21% if it becomes efficient. Ankara Training and Research Hospital should become efficient if it reduces Wages and Personnel Expenses by 20.51%, other expenses by 22.63% and amortization and depletion by 67, 30%. While the unprofitability level of the unit is -21.47% its profitability level will reach up to 4% if it becomes efficient.

Tokat Vali Recep Yazıcıoğlu State Hospital should become efficient if it reduces Wages and Personnel Expenses by 7.70%, the expenses for outsourced benefits and services by 16.16% and amortization and depletion by 49.95%. While the unprofitability level of the unit is -29.76%, its profitability level will reach up to -19% if it becomes efficient. Afyon state hospital should become efficient if it reduces the expenses for direct raw materials and supplies by 5.02%, the expenses for outsourced benefits and services by 34.20% and other expenses by 9.38%. While the unprofitability level of the unit is 3.54%, its profitability level will reach up to 14% if it becomes efficient. Muş State Hospital should become efficient if it reduces Wages and Personnel Expenses by 18.69%, the expenses for outsourced benefits and services by 37.48% and other expenses by 17.21%. While the unprofitability level of the unit is -11.72%, its profitability level will reach up to 12% if it becomes efficient.

Konya Numune hospital should become efficient if it reduces Wages and Personnel Expenses by 27, 69%, the expenses for outsourced benefits and services by 8, 50% and amortization and depletion by 39, 29%. While the unprofitability level of the unit is -52.60%, its profitability level will reach up to -22% if it becomes efficient. Muş Maternity and Pediatric Hospital should become efficient if it reduces the expenses for direct raw materials and supplies by 9.46% the expenses for outsourced benefits and services by 31.97% and amortization and depletion by 31 and 03%. While the unprofitability level of the unit is -15.29%, its profitability

level will reach up to -2% if it becomes efficient.

İzmir Dr.Suat Seren Chest Diseases and Chest Surgery Training and Research Hospital should become efficient if it reduces the expenses for direct raw materials and supplies by; 5, 57%, the expenses for outsourced benefits and services by 28, 74% and amortization and depletion by 32, 54%. While the unprofitability level of the unit is -27, 61%, its profitability level will reach up to -15% if it becomes efficient.

It has been observed that the majority of the inefficient hospitals spend excessively on outsourced benefits and services and Personnel Wages and Expenses. To be more precise, these hospitals provided services such as sanitation, catering, security and information technologies paying higher prices when compared to efficient units. In general, these hospitals are suggested to reduce the expenses for Wages and Personnel expenses by decreasing the number of personnel due to the fact that they have inactive personnel, and it is suggested that these inactive personnel should be employed in other health care units. These two expenses are followed by amortization and depletion as the third biggest expense. It is necessary that most of these inefficient hospitals revise their policy on the allocation of amortization and depletion. In addition, almost half of the inefficient hospitals have been observed to have excessive expenditure on direct raw materials and supplies. It has been found that the inefficient hospitals spend excessively especially on medical consumable materials.

Conclusions

The results of DEA provide valuable information in terms of administrative concerns. DEA identifies the efficiency of each decision making unit in comparison with other decision making units in the analyzed data set. Thus, the least efficient decision making units are identified and data relating to the extent to which the efficiency of these decision making units can be increased is obtained. In case that a decision making unit is inefficient, DEA suggests the necessary strategies to increase the efficiency of this unit, referring to the efficient decision making units. It is possible to ensure that all units are efficient, using the estimated reference values.

This study has measured the financial performance of the hospitals, identified their efficiency and profitability/unprofitability values. The results are subsequently examined, for each inefficient unit, to ascertain the expenses that need improvement and the extent to which these expenses need to be improved and the potential effect of these improvements on the profitability level of the units has been determined.

Table 3 presents the results indicating the efficiency, inefficiency, profitability and unprofitability of the decision making units investigated in this study. As is seen in Table 3, it is possible that efficient units turn out to be unprofitable and inefficient units profitable. However, it is

Table 3. Efficiency and profitability results of the decision making units (%).

Decision making units	Efficient		Inefficient	
	Profitable	Unprofitable	Profitable	Unprofitable
Hospitals	0.13	0.19	0.13	0.56

seen that inefficient units are mostly unprofitable.

A big proportion of the expenses for health care are on pharmaceuticals and hospitals. In our country, a remarkable proportion of the health care service is undertaken by hospitals affiliated with the Ministry of Health. Therefore, it is an undeniable fact that the hospitals affiliated with the Ministry of Health should be administrated efficiently and effectively.

Considering the total efficiency of the 16 hospitals, the study has revealed that 13, 43% of the total expenditure of the hospitals is used inactively. As far as the total profitability of these hospitals are concerned, it has been found that the expenses should be reduced by 10, 43% to equalize the income and expenses. As a result, it can be suggested that with the help of the improvement in the expenses of hospitals affiliated with the Ministry of Health, the said inactive sources can be used to invest on various health care facilities (for preventive health care services or establishment or renovation of health care institutions) or the total expenses for health care can be reduced.

The results of this study provide invaluable guidance for not only the central administration of the Ministry of Health, but also hospital managers. In order to determine the measurements to be taken, it is important to identify the efficiency level of a hospital in comparison with other hospitals, but it is also important to identify the efficiency levels of the various units in a hospital that provides service and, hence, has income and expenses. Therefore, in an efficiency measurement study, it will be more accurate to regard hospital units as decision making units. It is essential that hospital managers know which unit and which source of the unit cause inefficiency.

Today, surgery room equipment alone requires million-TL investment and this clearly indicates that a hospital has much more equipment and devices than a small-scale industry organization does and most of these equipment and devices are provided from abroad. Considering these, it would be unrealistic to say that hospitals utilize the available sources to the fullest to meet the health care needs of the public since not every hospital management in our health care system benefits from scientific principles and techniques sufficiently. As a result, some hospital managements fail to make an economical and rational decision, which leads to a waste of sources, though not deliberate. Therefore, it is necessary that scientific principles and techniques are considered in decision and policy making processes in

hospitals and to ensure this it is necessary to employ experts in management positions in the first place.

The results of this study have revealed that a considerable number of hospitals are not only inefficient but also unprofitable. The quality of hospital management personnel is of great significance due to the fact that the financial or non-financial performance of a hospital is under the responsibility of the hospital management squad. The hospitals affiliated with the Ministry of Health have always been administrated by professionals with a degree in medicine. The system called Public Hospitals Unions has not yet put into practice but once put into practice, it is expected to provide a solution for the problems concerning the effective and efficient management of hospitals affiliated with the Ministry of Health. The suggested law is supposed to provide the necessary improvement since it suggests that hospital unions should be classified through a performance assessment system, which means competition among the hospital unions; and another suggestion of the law under consideration is that the administrative staff will be composed of professionals with a degree in health care management, business management, economics, law, accounting and finance as well as professionals with a degree in medicine. The finding that Ankara Yüksek İhtisas Training and Research Hospital, the only public entity hospital in the scope of this study, is a super efficient hospital (though not profitable) is a good example to illustrate the necessity to put the suggested improvements into practice.

Another deficiency of the hospitals today is that they do not have a cost accounting system. A well-structured cost accounting system is required to provide the financial information needed to make decisions which will facilitate the efficient use of sources.

Hospitals should take the necessary measurements to reduce their expenses according to the efficiency and profitability results of the study. This is a significant administrative process which would require technical information and skills such as the qualitative and quantitative distribution and size of personnel, estimated duration of hospital stay, basic occupancy rates, medical devices to be used and investments to be made and so on. Therefore, modern business management principles should be employed by utilizing scientific principles and techniques in demand forecasting, human resources planning, capacity planning, stock management and financial planning.

Expensive and constricted capital makes conscious

management of financial affairs compulsory. Hospitals, in particular, should invest their surplus cash in time deposits or repo or they should benefit from the advantage of cash payment in hospital purchases.

To conclude, the main goal of hospitals affiliated with the Ministry of Health should be to ensure quality, efficient and effective health care service provision. Although it is not the main concern to increase to profitability of these hospitals, it is necessary to build a competitive atmosphere to encourage and ensure that hospitals reach the desired efficiency levels by determining their financial efficiency levels. As far as the evaluation of hospital performances is concerned, it should be more accurate to include indicators reflecting the social responsibility of the hospitals as well as financial indicators in these analyses. Moreover, it is thought to be more beneficial to evaluate the performances of hospitals in accordance with the results of comparative analyses of different hospitals, rather than evaluating hospitals and hospital units providing the same service according to pre-set standard rates.

REFERENCES

- Akal Z (1992). Business-to-Total Performance Efficiency, Profitability and Cost Comparisons on Manufacturer Public Institutions, National Productivity Centre Publications, Number 482, Ankara.
- Aydemir ZC (2002). Comparative Resource Utilization Efficiencies of the Turkish Provinces in the Context of Regional Competitiveness: An Application of the Data Envelopment Analysis Technique, DPT Specialist Dissertation, Ankara, P. 2664.
- Berkay JB (2002). Gaining and Sustaining Competitive Advantage, Printice Hall, New Jersey.
- Baş İM, Artar A (1991). Productivity Control, Measuring and Evaluation Models for Firms, Ankara.
- Bingöl D (2003). Human Resources Management, Beta Publications, 5. Printing, İstanbul.
- Boles JS, Dyson RG, Lothia R (1995). Salesperson Evaluation Using Relative Performance Efficiency: The Application of Data Envelopment Analysis, *J. Personal Selling Sales Manage.*, 15(3): 36.
- Boussofianne A, Dyson RG, Thanassoulis E (1991). Applied Data Envelopment Analysis, *Eur. J. Operat. Res.*, 52 (1): 1-15.
- Çalık T (2003). Performance Management: Definitions Concepts, Principles, Gündüz Training and Publishing, Ankara.
- Donthu N, Hershberger EK, Osmonbekov T (2005). Benchmarking Marketing Productivity Using Data Envelopment Analysis, *J. Bus. Res.*, 58(11): 1474-1482.
- Gencer H (2006). The Relations between General Business Performance and Financial Performance-an Application in Sector of Cement, Unpublished Master's Thesis, Gaziantep University, Social Sciences Institute, Gaziantep.
- Godwalla YH, Batra HC, Johnson JA, Charleston C (1997). Managing Hospitals in Dynamic Environments, *Int. J. Health Care Qual. Assur.*, 10-5: 202-207.
- Güçlü A (1999). Productivity Measurement at Hospitals of Turkish Armed Forces: An Application Data Envelopment Analysis, Unpublished PhD Thesis, Turkish General Staff of the Gülhane Military Medical Academy, Ankara.
- Halis M, Tekinkuş M (2003). Government Performance Management, Contemporary Approaches in Public Administration, Seçkin Publications, Ankara.
- Homburg C (2001). Using Data Envelopment Analysis to Benchmark Activities, *Int. J. Prod. Econ.*, 73(1): 51-58.
- Kenger E (2001). Auditor Assistants Training Notes, http://www.ydk.gov.tr/egitim_notlari/denetim.htm, pp. 38-43.
- Pervaiz KA, Kwang KL, Mohammed Z (1999). Measurement Practice for Knowledge Management, *J. Workplace Learn. Employee Counselling Today*, MCB University Press, 2(8): 305-307.
- Ramanathan R (2005). Operations Assessment of Hospitals in the Sultanate of Oman, *Int. J. Operat. Prod. Manage.*, 25(1): 39-54.
- Tepe M (2006). Usage of Data Envelopment Analysis in Benchmarking Study, Unpublished Master's Thesis, İstanbul Technical University, Sciences Institute, İstanbul.