

# MEASURING THE EFFICIENCY OF UNIVERSITY LIBRARIES USING DATA ENVELOPMENT ANALYSIS



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# Background of Data

## Envelopment Analysis (DEA)

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- DEA is very appropriate technique for evaluation of non-profit organizations, such as hospitals, tax offices, schools, universities and libraries.
- DEA can handle multiple inputs and outputs.



# **Background of Data Envelopment Analysis(DEA)**

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- **Data envelopment analysis (DEA), occasionally called frontier analysis, was first put forward by Charnes, Cooper and Rhodes in 1978.**
- **The performance of a unit is evaluated by comparing its performance with the best performing units of the sample. Best performing units form the efficiency frontier. If the unit is not on the efficiency frontier it is considered to be inefficient.**



## Research Framework and Data Set

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**The present analysis is based on the official reports of the following five University Libraries in Varna - Bulgaria for 2002 and 2003.**

1. The Library in the University of Economics





# Research Framework and Data Set

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## 2. The Library in Free University



# Research Framework and Data Set

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## 3. The Library in Naval Academy



# Research Framework and Data Set

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## 4. The Library in Technical University





# Research Framework and Data Set

## 5. The Library in Medical Academy





## Research Framework and Data Set

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**We have estimated the following six inputs:**

- 1. Number of staff**
- 2. Printed edition expenses**
- 3. Expenses on electronic databases and software**
- 4. Building space**
- 5. Wages**
- 6. Technical equipment**



# Research Framework and Data Set

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## **The outputs are:**

- 1. Register readers**
- 2. Customers served**
- 3. Books borrowed**



## Results

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- **The Libraries in the Technical University, in the University of Economics and in the Free University form the efficiency frontier for the two observed periods.**
- **The Libraries in the Medical Academy and in the Naval Academy work less efficiently during the period.**
- **DEA recommend benchmarks for the inefficient Libraries.**



# Results

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- **For the Library in Naval Academy it is advisable to follow the model of DMU F3 - the Technical University or that of F5 - the Free University in the year 2002.**
- **In order to improve their efficiency, the Libraries in the Naval Academy and in the Medical Academy can choose from the following variants or some mix of those:**



# Results

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- 1. Year 2002 the Library in the Naval Academy could reduce its expenses on printed editions by 5399,74 BGL, or reduce its electronic edition expenses by 1335,56 BGL.**
- 2. The Library in the Naval Academy could make some efforts to increase its outputs – the borrowed literature approximately by 6214 or customers served by 5138.**
- 3. The Library in the Naval Academy uses technical equipment, which could be decreased by 5582,85 BGL.**
- 4. For year 2003 the Library in the Medical Academy could decrease its expenses on printed books and journals by 39733,59 BGL or it could reduce its expenses, made for electronic issues by 4552,85 BGL.**
- 5. The expenses on technical equipment of the Library in the Medical Academy exceed with 40092,5 BGL.**



# Conclusions

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- Data envelopment analysis is very useful tool for estimating the University Library performance.
- Based on DEA the library administration might choose new strategy in order to operate in more efficient mode.