

# Performance Evaluation of Biotechnology Pharmaceutical Industry in Taiwan using Data Envelopment Analysis

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## ABSTRACT

The biotechnology industry is a star industry that the world is focusing in 21st century, and The Ministry of Economic Affairs in Taiwan has already considered the biotechnology industry is one of the binary star industry in “ Two Trillion and Twin Star Industries Development Plan ” as well. The biotechnology industry includes three types: biotechnology pharmaceutical industry, biotechnology medical device industry and newly arisen biotechnology industry. The sales amount of biotechnology pharmaceutical industry has contributed the most of the total sales amount of biotechnology industry by 2005. This sales amount was surpassed by that of biotechnology medical device industry until 2006. Thus, this research uses Data Envelopment Analysis(DEA) to perform evaluation of biotechnology pharmaceutical industry. In the evaluation process, a two-stage DEA was failed because the pre-assumptions are wrong. Actually, the assumption of considering makes a mistake. The patent effect of making profits is postponed in practices. The scores of decision marking unit(DMU) was fluctuated by environment in the proposed fuzzy multi-objective data envelopment analysis. In addition, in the slack variable analysis, it shows that nearly 50% of the DMUs have the tendency to over-invest. And in the sensitivity analysis, the threshold h the efficiency value has no influences on the computed results. Finally, the discrimination power of the fuzzy multi-objective DEA is better than that of traditional DEA.

Keywords : Data Envelopment Analysis ; Biotechnology Pharmaceutical ; Fuzzy ; multi-objective ; Performance Evaluation

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