

# iDEAs

**Internet-Based Data  
Envelopment Analysis  
System**

*for*

**System-Based Self-  
Assessment of Industrial  
System Productivity**



**Developed by**

**Keck Virtual Factory Lab**

**Georgia Institute of Technology**

<http://factory.isye.gatech.edu>

## Why Develop iDEAs?

"So how am I doing?" This is a common question asked by companies to gauge how competitive they are in the market. Traditionally, analysts have looked at productivity in terms of one input and one output metric, e.g., lines picked per labor hour. One can easily compare oneself to others using this quantitative measure. This traditional approach falls short of giving a complete picture of system performance, because factories, warehouses and other industrial systems have multiple input metrics (raw materials, labor costs, capital costs) and output metrics (units shipped or produced, order fill rate).

For the past twenty-five years, researchers have used data envelopment analysis (DEA) to analyze systems with multiple input and output metrics. DEA allows one to construct a "theoretically most efficient" hypothetical system from a population of systems for which one has data. Then a specific individual warehouse can be compared to this hypothetical warehouse to see how efficient it is, considering all the input and output metrics simultaneously.

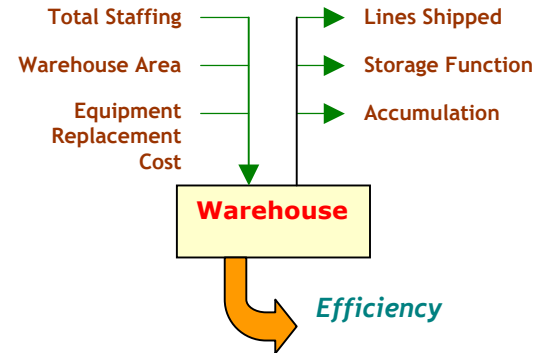
DEA is a powerful tool, but it is not intuitive or easily understood without a large time investment and a technical background. Most firms do not have the required capability or resources.

We have developed iDEAs to fill this need. Initially focusing on warehousing, we have implemented DEA in iDEAs, a system that lets warehouse managers benchmark their performance against other warehouses. iDEAs is accessible as a browser-based application at the following URL:

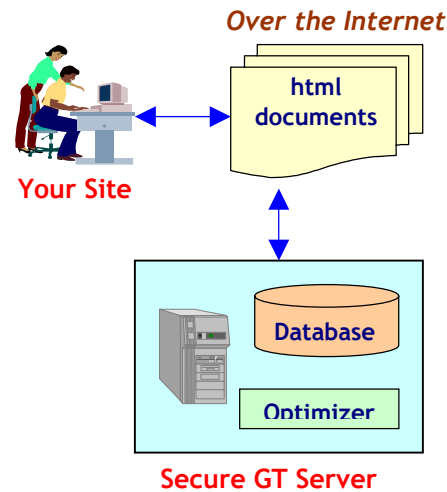
<http://www.isye.gatech.edu/ideas>

## How Is iDEAs New or Different?

- Generic model of warehouse input/output metrics.

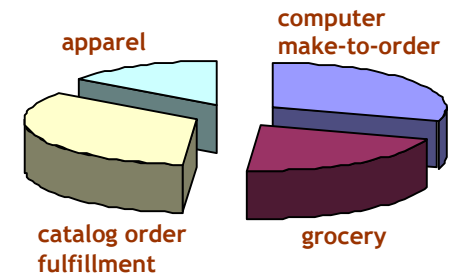


- Web-based system, making DEA technology available to a large user community with secure access to sensitive data.



- All input and output metrics considered simultaneously in the analysis, without the need for arbitrary or subjective weight factors.

- Segmented analysis of productivity available upon request - by industry, by operation type or size, or by operation characteristics (e.g., pallet handling vs. case handling).



## iDEAs Development

The iDEAs development team has been working since 1999 to create a generic platform for benchmarking warehouses and other industrial systems. The current system addresses warehouses and is implemented using Java™ and the WebObjects™ web application server from Apple Computer. A database stores warehouse data for all users, and an optimizer performs the DEA computations.

The iDEAs team consists of:

Dr. Leon F. McGinnis  
Dr. T. Govindaraj  
Dr. Gunter P. Sharp  
Mr. Wen-Chih Chen (Ph.D. student)  
Mr. Andrew Johnson (Ph.D. student)

In addition, a number of consultants, software suppliers, trade associations, and warehousing firms have contributed to the development and deployment of iDEAs.

There are opportunities to develop company-specific implementations of iDEAs for companies having a large number of sites, and desiring to do internal benchmarking on an ongoing basis.

## iDEAs Research Agenda

iDEAs is a platform for research and industry interaction in benchmarking performance of industrial systems such as factories, warehouses and supply chains. The current focus is on warehousing.

- Productivity analysis for multiple factors using the DEA methodology.
- Theoretical linkages from traditional single-factor productivity analysis methods to DEA methods.
- Development of methods to diagnose reasons for poor system performance, and to identify opportunities to improve performance.
- Analysis of performance by industry segment.
- Eventual goal to expand focus to factories and supply chains.

## How Does Industry Benefit?

- Access to a web-based system that can be used to assess performance of a particular warehouse in comparison to a large number of other warehouses.
- Neutral site for hosting the web-based benchmarking system, and for testing new benchmarking ideas and software.
- Security of individual company data through secure login.
- Large user base (currently approximately 1,000 users and 160 warehouse datasets).
- Cost-effective source for special projects and analyses.
- Source for highly qualified graduates with deep expertise in benchmarking modeling and analysis.
- Current availability of the iDEAs warehouse benchmarking system - NO CHARGE.



Researching Tomorrow...

### Vision

We will create an organization and facility with its purpose to see that modeling technology is as widely deployed in manufacturing as spreadsheets and as frequently used as cellular phones and pagers.

### Mission

- To bring engineering discipline to factory modeling
- To promote complete and integrated modeling of factory systems
- To document and disseminate modeling success stories
- To educate a new generation of modelers

For more information, contact:

Leon F. McGinnis

404-894-2312

[leon.mcginnis@isye.gatech.edu](mailto:leon.mcginnis@isye.gatech.edu)

<http://www.isye.gatech.edu/ideas>

