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1989 (26th) Space - The New Generation

Apr 25th, 4:00 PM

Paper Session I-C - CORABI - The Impact of the University on Corporate, Regional, and State Commercial Space Development

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The Impact of the University on Corporate, Regional, and State Commercial Space Development

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Presented: 25 April, 1989
Space Congress
Cocoa Beach, Florida

Background

Studies and Recommendations for Bilateral Action

- Florida Governor's Commission on Space
- National Academy of Sciences
- Business Higher Education Forum
- "Space Business, a Financial Analysis"
- "Spaceport Activity Impact Study"
- "Survey of Factors Enhancing the Growth of Aerospace Industry in Florida
- "Evaluation of Impact of Space Related Activities in the State of Hawaii"

Space Research Institute
Florida Institute of Technology

List (General) of Action Categories

- Corporate Financial Support of Colleges and Universities
- Corporate Associate and Affiliate Programs
- Cooperative Education
- Corporate Financial Support of Students
- Corporate Financial Support of Faculty
- Research Agreements -- bilateral and consortium
- Training Programs
- Personnel Exchanges
- Conferences, Colloquia and Symposia
- Consultancies
- Volunteer Programs
- Corporate Access to Unique Resources
- Corporate Recruiting of Students
- Joint Projects that Address National Concerns

Statement of the Problem (Potential Defects)

1. How do you maximize Impact (given so many categories)?
2. Correlation of Elements.
3. Regional and Local Constraints.
4. Real-World Data not Precise.
5. Feedback: Chicken or Egg?

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Definition of Variables (General)

1. **The University**
 - Number of Undergraduates in area(s) of consideration
 - Number of Graduate students in area(s) of consideration
 - Number Faculty in area(s) of consideration
 - Number of Departments in area(s) of consideration
 - Number of specialized Institutes
 - Gross Operating Budget
 - Research and Development Budget (in area(s) of consideration)
 - Training Programs and Curricula in area(s) of consideration
 - Capital Outlay in area(s) of consideration
 - Geographic Location

2. **The Region and State**
 - Federal Labor Force (number)
 - Federal R&D Budget Captured in area(s) of consideration
 - Air Transportation
 - Tax Environment
 - Proximity to University
 - Vocational Capability
 - Energy Cost(s)
 - University R&D Capability
 - Weather/Climate

Region and State (Continued)

- Developable Land
- Labor Skill/Availability
- Local Business (manpower, capital, R&D)
- Work Ethic
- Labor Cost(s)
- Cost of Living
- Highways
- Other Transportation Elements

3. The Corporation

- Workforce Number in area(s) of consideration
- Profitability
- Growth Rate
- Competitive Posture
- Number of Employees in Degree Programs
- Corporate Contributions to Academia
- Aggregate Contract Research in area(s) of consideration
- Joint/Partnership Contract Research
- Cooperative Education
- Capital Outlay
- In-house Education Expenditures
- Expenditures for Consultants
- Corporate Use of University Resources
- Corporate Recruiting of Students
- Educational Budget Resources

A Linear Model

Dependent Variable -- Any of the Above
Independent Variables -- Any or all of the others

- Form of the Equation

$$y_i = a_1 x_{i1} + \dots + a_n x_{in}$$

- System of Equations

$$y_1 = a_{11} x_{11} + \dots + a_{n1} x_{n1}$$

$$y_2 = a_{12} x_{11} + \dots + a_{n2} x_{n2}$$

$$y_i = a_{1i} x_{11} + \dots + a_{ni} x_{ni}$$

- Constraints (trivial)

i greater than or equal to n

Solution Method

- Linear Least Squares
- Matrix Inversion Technique
Values of a's
Formal Errors of a's
Correlation of a's

Sample Calculations

1. Real World (Aggregate Model for Texas, Florida, Hawaii)
2. Fictional Calculation for 10 universities, 10 businesses and 10 regions.
3. Refinements
 - Investigate to see if Variables Non-Linear
 - Develop Extensive Database (of relevant quantities)
 - Make Some Projections