The Evolution of an American Research University

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Outline

- Ohio
- Ohio State University
- Budget & Budget Restructuring
- Graduate / Research Programs
- Undergraduate Programs
- Conclusions
OHIO
$540 MILLION BUDGET HOLE

Governor orders 4.75% in cuts

State agencies given 3 weeks to trim their budgets; layoffs likely, tax hike not ruled out
“Ohio is a third-world country.”

R. L. Snyder, M.S.E. Chair, 1996-2002
The Rust Belt / Manufacturing Belt)
Ohio Economy by Sector

- 19% Manufacturing
- 19% Trade
- 11% Government
- 9% Health / Education
- ...
- 0.4% Agriculture
Ohio Attributes vs. U.S.

- 7\textsuperscript{th} in GDP
- 3\textsuperscript{rd} in manufacturing

But:
- 49\textsuperscript{th} in economic growth (5 years)
- 38\textsuperscript{th} in higher education funding
- 90\% of U.S. average per capita income
- OSU: 39\textsuperscript{th} in salaries (of 62 AAU)
Ohio Per Capita Income, Percent of U.S. Figure

Percentage

Year

U.S.A

Ohio
State Support for OSU (2008 Dollars)

Years: 1985 to 2015

Millions of Dollars:
- 500
- 450
- 400
- 350
- 300

Yearly support shows a decreasing trend from 1985 to 2015.
OSU State Support / Total Revenue

Fraction of Total Revenue vs. Year


Fraction of Total Revenue: 0.3, 0.2, 0.1, 0.0
COLUMBUS
Columbus Skyline and Convention Center
Columbus, Ohio Skyline at Night
Columbus, Ohio Skyline from Ohio State University
OHIO STATE UNIVERSITY
Similarly-Ranked Universities
(OSU = 62, Shanghai Jiao Tong)

US:
- University of Florida 58
- Carnegie Mellon 62
- Purdue University 65
- Brown University 71
- Case Western Reserve 83

World:
- University of Munich 57
- Australian National University 59
- University of Oslo 64
- Osaka University 68
- University of Melbourne 73
- Tohoku University 79
“Peer Group” or “Benchmarks”
Average SJT Ranking: 35

Wisconsin 17
Michigan 21
California Los Angeles 26
Illinois 26
Minnesota 28
Washington 41
Penn State* 42
Texas Austin* 47
Ohio State 62
Arizona 96
What is OSU Known For?

1. Football, football, football…
2. The largest U. S. university
3. Most industrial research
Football Facts

• **Top 5 (of 118), 5 of 6 years**
  - Champion, 1 year
  - Runner-Up, 2 years

• **Highest athletics budget ($120m)**
  - $110k per athlete vs. $30k per student

• **Coach compensation: $3m/yr.**
  - President: $1m/yr.
OSU Students at Football Game – O-H-I-O
OSU Facts

- Summary Facts
  Students: 60,000
  Buildings: 927
  Tuition: $9,700 Ohio / $21,000 non-Ohio
  Income: $4 billion, Research: $720 billion

- Educational Programs
  Undergraduate programs: 167
  Graduate programs: 233
  Courses: 12,000

- Faculty and Staff
  Regular faculty: 3,050
  Staff: 21,000
Video 2 - CAMPUS
Industrial Research at OSU

- #1 among U.S. publics
- #2 among U.S. universities
- $113 million (2006)
  Vs. benchmark avg.: $42 million
Inverted Rankings (100 = #1)

Year

[(100) - (Rank)]

Australian National University (Shanghai Jiao Tong)
Ohio State University (U.S. News & World Report)
Ohio State University (Shanghai Jiao Tong)
University of Melbourne (Shanghai Jiao Tong)
University of Sydney (Shanghai Jiao Tong)
State Support for OSU (2008 Dollars)
How is it possible to improve ranking with less support?

**Answers:**

- Other sources of funds (tuition, research)
- Hard decisions, focused programs
Inverted Rankings (100 = #1)

Australian National University (Shanghai Jiao Tong)
Ohio State University (Shanghai Jiao Tong)
Ohio State University (U.S. News & World Report)
University of Melbourne (Shanghai Jiao Tong)
University of Sydney (Shanghai Jiao Tong)
BUDGET & BUDGET RESTRUCTURING
State Support for OSU (2008 Dollars)


Millions of Dollars: 300, 350, 400, 450, 500
State Support vs. Tuition (2008 Dollars)

Year:
- 1985
- 1990
- 1995
- 2000
- 2005
- 2010

Millions of Dollars:
- 200
- 300
- 400
- 500
- 600

Graph showing the comparison between State Support and Tuition from 1985 to 2010.
State Support / FTE Student

Benchmark Average

Ohio State University

2008 Dollars

Year

State Support + Tuition / FTE Student

Benchmark Average

Ohio State University
Budget Restructuring (2002 - )
(Allocations to colleges.)

• Principles (partial list):
  – Decentralized decision-making
  – Resources linked to generating units (in part)

• Concept
  – Rebasing (5 year interval: decision of priorities)
    • align one-time budget with mission
    • consider revenues / expenses by unit
  – Incremental (automatic annual budget changes)
    • Based on credit hours taught & level
Budget Restructuring
What it got right.

• Space costs allocated

• Visible formula, allow for planning

• Held back central funds

• Not purely “historical,” not business-as-usual
Budget Restructuring
What it got wrong.

• Rebasing not based on mission

• Rebasing information from short period

• Subsidy / tuition skew

• No protection of central priorities
SPECIAL PROGRAMS – GRADUATE & RESEARCH
Graduate, Faculty, Research Programs

• State of Ohio
  – Ohio Eminent Scholars (1983-91+)
    • $40 million
  – Third Frontier (2003 - )
    • $113 million

• Ohio State University
  – Selective Investment (1988-91)
    • $90 million
  – Targeted Investments in Excellence (2005)
    • $110 million
Ohio Eminent Scholars (1988-91)
Approx. $40 million 2008 dollars, OSU

Funds/Chair: $500k endowment, $750k match

Objective: “Attract scholar-leaders of national or international visibility”
[To bring] “educational resources to bear on compelling statewide problems”

Concept: Cost-sharing proposals with Ohio industry support letters, externally reviewed.

Third Frontier (2003 - )
Approx. $113 million
(OSU, 5 years, $1.6 b total)

Objective: Build world-class research capacity
Capital formation, development of new products
Finance advanced mfg. technol., existing industries
Leverage federal and private sector support, $6 billion.

Concept: Minimum 1:1 cost share. Job creation promises.
Collaboration required (Univ-Univ-Industry)

Outcome Areas (OSU):

- Biomedical (5) $41 million
- Biofuel (3) $15 million
- Nano (3) $33 million
- Lung Cancer $8 million
- Propulsion & Power $11 million
- Mult. Sclerosis $4 million
- Superconductivity $1 million
Selective Investment (1998-91)
Approx. $90 million (2008 dollars)

Funds/Unit: $1 million, continuing, ½ central – ½ unit.

Objective: Encourage, identify, and strengthen areas of excellence within the university.

Concept: Identify strongest departments, give them the resources needed to move near the top of their fields.

Outcome:

<table>
<thead>
<tr>
<th>Biomedical Eng.</th>
<th>History</th>
<th>Neuroscience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>Law Academic</td>
<td>Physics</td>
</tr>
<tr>
<td>Electrical Eng.</td>
<td>Mathematics</td>
<td>Psychology</td>
</tr>
<tr>
<td>English</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## SI Department Changes, 1998-2003
(No data for other units.)

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>2003</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td># Applications</td>
<td>133</td>
<td>150</td>
<td>13%</td>
</tr>
<tr>
<td>GRE - Verbal</td>
<td>589</td>
<td>593</td>
<td>1%</td>
</tr>
<tr>
<td>GRE - Quantitative</td>
<td>639</td>
<td>682</td>
<td>7%</td>
</tr>
<tr>
<td>GRE - Analytic</td>
<td>644</td>
<td>697</td>
<td>8%</td>
</tr>
</tbody>
</table>
Change of Indicators 1998-2003,
SI Departments vs. OSU Total

Publications / Department
- SI: 2.8X
- OSU: 3.1X

% Publications in Field
- SI: 3.1X
- OSU: 1.3X

% Citations in Field
- SI: 1.3X
- OSU: 1.3X
SI Succeeds in Spite of Budget Restructuring

OF 13 Selective Investment Departments:

- 7 Received Relative Budget Increases

- 6 Received Relative Budget Decreases
Targeted Investments in Excellence (2005)
$110 million (5 years)

Funds/Unit: $1 million, continuing, ½ central – ½ unit.

Objective: Stimulate scholarship and knowledge generation for impact on societal and global issues
Enhance the University’s reputation and prestige.

Concept: Support academic areas where OSU can achieve worldwide recognition.
Colleges review, select, support proposals.

Outcomes:
- Climate ($12m)
- Energy ($2m)
- Music (0.4m)
- Math/Bio. ($2m)
- Materials ($10m)
- Cancer ($6m)
- Diseases ($5m)
- Health ($2m)
- Plant Sci. ($3m)
- Cosmology ($5m)
Video 3 - Brian Thompson
Video 4 – Football-Research
Graduate & Research Program Indicators

• Freshmen retention rate

• Average ACT scores

• 6-year graduate rate
Market Share of Citations

Benchmark Average

Ohio State University
Faculty Honors and Awards

Number of Honors and Awards

Benchmark Average

Ohio State University

Year

2000 2001 2002 2003 2004 2005 2006 2007
National Academy Members

Benchmark Universities
+9.5, +19%

Ohio State University
+12, +120%
OSU SPECIAL PROGRAMS – UNDERGRADUATE
Undergraduate Program Philosophy

• “Better kids, better served” [M. Garland]

• Word-of-mouth is the best recruiting

• Selective admission (1988, 1995)

• Personalized, tailored attention

• Financial aid ($25m merit, $50m need)
Recent Undergraduate Programs

- First-Year Experience
- Learning Communities
- Denman Research Forum
- Collegium & Maximus
First Year Experience (FYE)

• **Concept:** Personalized activities for freshmen to ease the transition from high school

• **Examples:**
  – Picnic with Columbus Jazz Orchestra
  – Distinguished Speaker Series (Nobel Peace)
  – Camp Programs – Climbing, Canoeing, etc.
  – Lunch meetings for non-Ohio students
  – Alternative spring break: Habitat, e.g. (Part of “Service Learning” program.)
Learning Communities

• Concept: Tailored residential / educational programs

• Types and Qualifications:
  – Academic Interest (15)
  – Collegiate transition (4)
  – Global Awareness (5)
  – Scholarship cooperatives (2) (scholarship)
  – Scholars (13) (>27-29ACT, >20%)
  – Honors (2) (>30ACT, >10%, classes, thesis)

• Outcome: 90% today vs. ~0% 1995
Academic Interest Communities

Allied Medical Professions Learning Community
Business Honors Learning Community
Engineering Focus Community
Engineering House Learning Community
Exploration Learning Community
Food, Agricultural and Environmental Sciences L.C.
Human Ecology Learning Community
John Glenn School of Public Affairs L.C.
Math and Physical Sciences Learning Community
Nursing Learning Community
Pharmacy House Learning Community
Psychology Learning Community
Sports and Wellness Learning Community
Visual & Performing Arts Learning Community
Women in Engineering Learning Community
Engineering Focus Community

• Engineering design competitions
• In-hall tutoring, math and science
• Interact with faculty, staff, and professionals in engineering
• Social events
John Glenn School of Public Affairs

- Quarterly public policy discussions
- Participate in community service
- Speakers on political issues and perspectives
- Annual travel experience to 1-3 cities
- Early arrival program
- Leadership opportunities
Visual & Performing Arts L.C.

• Music practice rooms, dance studio
• Computer lab with arts software
• Performance theater
• Drawing studio, display cases
• Trips to theater and dance performances
• Annual travel program to a city to visit museums and/or performances
Denman Undergraduate Research Forum (1996 - )

- **Purpose:** “… showcase outstanding student research and encourage all undergraduates to participate in research.”

- **Eligible:** U.G. students involved in original research.

- **Prizes:** $22,000
Video 5 - Denman
Maximus Competition

• Purpose: Recruiting, merit scholarships

• Back story: Attract best students to campus

• Elements:
  – Qualified invitees (>30 ACT, 3%)
  – Write 2 essays: 10 winners, 10 others selected
  – All receive $2800/yr. scholarship
  – 70 Medalists receive full tuition ($9,700/yr.)
  – 10 Presidential Scholars - full tuition and expenses -> Collegium

• Outcome:
  – 70% of Maximus participants come to OSU, vs.
  – 50% of accepted applicants come to OSU
Collegium

- Help top students destined for graduate school

- Personal (one-on-one) assistance with applications for
  - internships
  - fellowships
  - grants
  - study abroad
  - graduate programs

- Workshops and networking opportunities

- Special interdisciplinary courses and seminars
Video 6 - Collegium
Undergraduate Program Indicators

- Freshmen retention rate
- Average ACT scores
- 6-year graduate rate
Freshmen Retention Rate

Benchmark Average

Ohio State University
Average ACT Score

Benchmark Average

Ohio State University
(2008 => 2.73)
COLLEGE OF ENGINEERING

Undergraduate Students: 4,700
Graduate Students: 1,300
Living Alumni: 46,000
Programs: 17
Faculty: 282 (10NAE)
Funding: $60 m OSU
           $129 m research
Mars Exploration Rover

- OSU developed the camera system
- Improved location accuracy by 100x.
Buckeye Bullet

Buckeye Bullet 2
World’s Fastest H₂ Vehicle

800 hp, 6-speed transmission
October 2007: World record 132mph
August 2008: 280 mph (450kph)
VIDEO 7 – Greg Washington
Dept. Materials Science & Eng.

• Ranked 14 in U.S. (among highest OSU)
• Highest $research / faculty
• Mission aligned with Ohio
• Benefits from most major programs:
  Ohio Eminent Scholar, Selective Investment,
  TIE, ...
• Faculty: 21 in 1998, 26 in 2008
FEI Titan
Resolution 0.07 nm
1st in world - 2006
Research Expenditures, MSE Department (2008 Dollars)

Fiscal Year

1,000,000 Dollars

Video 8: Glenn Daehn
Video 9: Derek Hansford
CONCLUSIONS
Conclusions

- Special programs effective
- Remarkable progress in view of budget constraints
- UG programs more successful than G programs. Why?
  - More resources ($75 million / yr. vs. $20 million / yr.)
  - Single purpose, central mandate
  - Not confounded by budget restructuring, conflicting priorities college / central
"All of the ideas and inventions that drive our knowledge economy are created at universities!"

E. Gordon Gee, President, OSU
OSU’s freshman class is brightest ever, again

High-school standings, test scores increase with Class of 2012

By Bill Bush
THE COLUMBUS DISPATCH

Jennifer Flis was accepted to Notre Dame and Case Western Reserve, but the 18-year-old is going to Ohio State University this fall.

"It’s big, so it comes with a whole host of opportunities," said Flis, who graduated from Bishop Hartley High School as its valedictorian. "I’m going to study engineering, and they have a really good engineering school."

Freshmen such as Flis are helping make this incoming OSU class the most academically qualified ever — the 14th year in a row that that university has been able to say that about students coming to the Columbus campus, said Allen Kraus, senior associate director of undergraduate admissions.

As a group, the freshmen "set a new standard," he said, with an average ACT composite score of 27.3, up from 27 last year. The SAT scores are up, too.

Of the 6,050 to 6,100 freshmen expected this year (the number was 6,110 last year), more than half were in the top 10 percent of their high school academically, up from 26 percent in 1997, the university said.

See OSU Page B2
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103