The Role of Diversity in US Competitiveness

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Three Powerful Forces Converging

• Technology is becoming ubiquitous
• Globalization is accelerating
• U.S Demographics are changing

Science and engineering capability will be the foundation of economic success for the US in the 21st century
Demand is High

6 million job Openings are projected for Technically Trained Talent
Projected # of job openings by technical field, New Jobs, & Net replacements, 1998-2008

Supply is International

- China: 240,000 (1.1%)
- European Union: 220,000 (3.7%)
- Japan: 180,000 (6.1%)
- U.S.: 150,000 (1.6%)
- India: 100,000 (0.2%)
- Taiwan: 60,000 (6.9%)

# of Engineering Graduates

(%) = Percent of 24 year olds with engineering degrees

Current Examples

- Radiology
- Investment Analysis
- Computer, Cell Phone Design
- Software Development
- Business Process Operations
- Research chemistry
- ...
What’s “Safe”?

- ‘Hands-on’ local services
- Face-to-face interaction
- ???

America cannot depend on the jobs that are ‘safe’ from global competition for our economic future
Potential Competitive Strategies

- Legal / trade barriers
- Capital investment
- Wage reductions
- Intelligent citizens
- High literacy
- Average years of education
Results

- >800,000 jobs moved outside the US, 2000-2004
- Centers of competence growing in India, China, Malaysia, Russia, …
- Emerging market governments investing in education, infrastructure

Center of gravity is shifting --
# Reality Check - Information Technology Workers

## Generalized Characteristics

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>Asia</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hourly wage</strong></td>
<td>1.00</td>
<td>.30</td>
<td>.20</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
<td>1.00</td>
<td>.50</td>
<td>.40</td>
</tr>
<tr>
<td><strong>Math Skills</strong></td>
<td>Fair</td>
<td>Good</td>
<td>Excellent</td>
</tr>
<tr>
<td><strong>Dev Methods</strong></td>
<td>Fair</td>
<td>Excellent</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Entry Level Qual’s</strong></td>
<td>AA/BS</td>
<td>BS/MS</td>
<td>BS/MS</td>
</tr>
<tr>
<td><strong>Advanced Degrees</strong></td>
<td>Scarce</td>
<td>Available</td>
<td>Abundant</td>
</tr>
<tr>
<td><strong>English Skills</strong></td>
<td>Excellent</td>
<td>Good</td>
<td>Fair</td>
</tr>
</tbody>
</table>
We must react swiftly-

- Make American technology workers the most **productive and creative** in the world
  - Innovative
  - Collaborative
  - Highly skilled
  - Adaptive
  - Efficient
Critical Characteristics

- Teamwork
- Discipline
- Process oriented
- Analytical skills
- Problem solving
- Creativity
- Integrity
- Accountability
- Adaptability
Competitive Assets

- Diversity
- Shared culture
- Creativity
- Rule of Law
- Flexibility
12th Grade Math & Science Achievement ... a national tragedy

# URM Retention Rates in Engineering

## Retention Rates by Selected Discipline, 2001

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Retention Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total URM</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>35.0</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>37.9</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>47.6</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>36.3</td>
</tr>
<tr>
<td>Industrial Engineering</td>
<td>44.2</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>38.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>38.9</strong></td>
</tr>
</tbody>
</table>

Note: Retention rates for "total" include only the six disciplines listed.

Source: “Walking the Talk” in Retention-to-Graduation: Institutional Production of Minority Engineers – A NACME Analysis July 2003 Daryl E. Chubin and Eleanor Babco
Lost Opportunities

Issue: Demographic Shifts Not reflected in Enrollments, Degrees, or Workforce

Source: Report from the Engineering Workforce Commission; 2003 Degrees, and 2000 Census Data
Challenges

- Weak cultural focus on education
- Fragmented strategy and tactics
- Slow action
- Poor follow-through
- Inadequate investment
MUST
What can we do?

- Set aggressive goals
- Use data to understand what really works
- Work together collaboratively
  - Move upstream to improve K-12 education
  - Attract top talent into degree programs
  - Train them to be the best in the world
  - Retain students to graduation/advanced degrees
  - Help them grow into the next generation of leaders
Their future depends on our actions...