

Globalization of Engineering

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Summary –

- Ivory towers of yesteryear
- Expanding missions of engineering colleges
- Global drivers of them
- Strategic consequences to anticipate



Ten Global Drivers –

1. Accelerating change
2. Accessible and inexpensive global communications
3. Global partnerships and engagements
4. Globalization
5. Expanding access to higher education
6. Expanding opportunities for talent
7. Cost control
8. Innovation
9. Great global problems
10. Leadership challenge



Global Drivers of Change in Strategies

Oliver Wendell Holmes advised,

“The great thing in this world is not so much where we stand, as in what direction we are moving.”



Global Driver 1: Accelerating Change

- Often reframe strategic vision → change in mission and service
 - Cell phone market and leaders
 - Energy resource predictions
 - Technology predictions 5 years hence
- Shorter time horizons
- Strategically global view
- Prescient about change



Strategic Issue 1.1:

The combination of global connectivity and accelerating change will increasingly create abrupt disruptions.

Universities and colleges must develop the mindset and processes to expect and respond to disruptive change.



Global Driver 2: Accessible and Inexpensive Global Communications

- Disruptive technological change
 - Text messages, Facebook, university networks
 - Security ?
 - Underutilized asset → problem



Strategic Issue 2.1:

More effective use of communication technologies in essentially every aspect of engineering college operation is a primary challenge and opportunity.

Most engineering colleges are behind in the use of available technologies.



Global Driver 3: Partnerships and Engagement Paradigm

- *Isolation and control* of information for innovation is not possible
- Idea replaced by *innovation creation* through partnerships and engagements
- Being fast and first is the global strategy
- Partnerships assemble assets
- Engineering colleges must engage, have impact and do it today



Strategic Issue 3.1:

“Partnerships and engagement” on a global platform will be imbedded in the engineering culture and will characterize engineering operations for many if not most of its functions.



Global Driver 4: Globalization

- All business is globalized.
 - Either it is a world without borders or
 - one formed by multinational subsidiary entities
- All countries are globalized whether by intent or circumstance



Strategic Issue 4.1:

Engineering must prepare students to prosper in global careers, responsibilities and understanding.

“Working around the world” for them will be similar to “working around the country” was for students a generation earlier.

The engineer’s “working world” is global.



Strategic Issue 4.2:

The footprint of engineering colleges will enlarge to reach foreign governments, inter-governmental organizations and multi-national corporations for services, research and education as it does in the home country.



Strategic Issue 4.3:

Universities and engineering will create definite-term programs abroad, programs having a defined beginning, middle and end.

Those three phases should be part of program planning.

Indefinite-term program commitments abroad will become unusual in a world of accelerating change.



Global Driver 5: Expanding Access to Higher Education

- Scale of global demand is enormous
- Plethora of options will expand.
- Books, as we know them, will diminish in number and use.
- Expanding need for certification
- Expanding need for retraining qualified engineers for “in-demand” opportunities
- Richer use of non-traditional partnerships to deliver content



Strategic Issue 5.1:

Engineering colleges will focus on serving defined higher educational niches because of the expanding range of possible missions.

Strategic Issue 5.2:

Demand driven by student expansions will create significant budgetary, facility and student qualification challenges for public engineering colleges and require significant supplemental public support.



Global Driver 6: Expanding Opportunities for Talent

- Sir Francis Bacon: “knowledge is power.”
- In-demand talent is especially powerful
 - Globalization of people driven by talent quest
- Accelerating change necessitates programs to nurture a current workforce.
- Acquiring current skills is a governing rule for today’s workforce.



Strategic Issue 6.1:

Talent, especially in-demand talent, is the coin of the global realm and a long-term issue.

Engineering colleges should ensure priority attention to nurturing this talent.

Strategic Issue 6.2:

Engineering colleges should nurture global talent in leadership, management and “current skills” for professionals across disciplines through targeted degree and certificate programs.



Global Driver 7: Cost Control

- Cost is high; cost for expanded student numbers is very high
- Responsibility for cost and quality falls on public universities
- Using incentives to shorten the time to degree; Most ideas from control are not new; Instituting classes of service with differential costs (like, flying coach class);
- Using time to degree to align educational costs and tuition fees; Allowing degree credit for other experiences;
- Acquiring degree credits through lower cost educational centers; Expanding use of differential costs by field of study and for study formats



Strategic Issue 7.1:

Generally, states, federal gov, students, and universities share the responsibility for financing public higher education

No compact balancing their responsibilities and allowing prediction of cost sharing one year in advance exists

It's cost sharing without agreement or predictability.



Global Driver 8: Innovation

- Answer to every “How will we . . . ? “ question
- Universities and engineering are natural centers
- Universities have the talent, research, facilities and capacity to lead innovation to economic development when an innovative culture is developed.



Strategic Issue 8.1:

Universities are now poised to create university-wide cultures of innovation, led by engineering, that would extend beyond the campus to surrounding communities and beyond them even internationally.

This is a major opportunity and challenge awaiting universities and engineering leadership.



Global Driver 9: Great Global Problems

- Climate change, environmental degradation, et alia
- 14 NAE Grand Challenges
- Everyone is linked to them
- Universal issues



Strategic Issue 9.1:

Universities will increasingly engage multi-disciplinary teams, usually led by engineering on great global problems.

Competitions, such as U.S. Dept of Energy's Solar Decathlon;

Service Projects, like Engineers Without Borders;

Challenges, like the NAE 'Grand Challenges'

Prizes, like million-dollar X-Prize for oil spill cleanup, or

More than 30 other major prizes at www.ideaconnection.com



Global Driver 10: Leadership Challenges

- Create a vision fulfilling the university and college missions while responding to these global drivers.
- Larger, public research universities and engineering colleges will likely confront most if not all these drivers.
- Shaping the university and college cultures so that they can contribute and prosper under these world drivers is the most important and interesting responsibility of university and college leaderships today.



THANK YOU FOR YOUR ATTENTION!



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