

I. Source

It is an excerpt from the IEEE Publication Services and Products Board Long Range Strategy. It is a synthesis of data collected by Tecker Consultants LLC and used as the basis for generating a long range strategy.

II. Credibility of Source

The data are high quality but costly to obtain as the process is labor- and time-intensive. This is a goldmine as it comes to us after being funded by IEEE at no cost to us yet is rich and insightful and most importantly rigorously researched. The main downside is that the information is nine years old.

III. Summary of Content and Conclusions

Demographic, Social and Consumer Values

- Globally, the population of engineers and other technology professionals will grow over the next 15 years.
- The largest percentage growth of TP will be outside of North America and Western Europe Post secondary educated.
- There will be a growing commoditization of technical professionals globally.
- The average length of a 'technical career' will be diminishing, which will increase need for continuing education to prepare people for mid-career job shifts.
- The need for and interest in technical information will increase dramatically.

Legislative and Regulatory Issues

- Funding agencies and government might mandate open access.
- There is likely to be increased legislation to promote “green” policies.
- In the area of international copyright and patent protection, we will likely see more activity, and multinational corporations will seek to strengthen IP and patent regulations.
- There may be more restrictive legislation and regulatory activity (like OFAC and ITAR) that prevents export of information.

-In the area of cross-border recognition of professional qualifications and credentials; there will likely be some regulations related to this issue.

Global Economic Climate

-There will be increased emphasis on conserving natural resources and on developing renewable (and “green”) energy sources as alternatives to oil and coal.

-There will be a continuing shift of world influence from present developed nations to developing nations.

-There will be a continuing “flattening” of the world as the internet allows people to be easily connected around the globe to conduct business. This will be especially true in areas of information and knowledge access which will influence business and education competitiveness.

-Centers of technology excellence will spread across the flat world.

-Wars and conflict will affect global economics (inflation risk, etc.).

Future of the Profession

-There will be a greater disconnect between individuals and employers.

-Engineering will continue to become more interdisciplinary.

-Employers will expect immediate value contribution.

-Engineering solutions will be broadly identified, collaboratively resolved and locally applied.

-Changing age demographics will pose a threat of knowledge loss as the “baby boom” generation’s more experienced professionals retires.

There will be a need to identify gaps in practical knowledge in transfer from one generation to the next.

Science and Technological Advances

-A smart, inter-communicating, personal, portable device will be commonplace and ubiquitous.

-Current boundaries between various disciplines, including science and technology will be less distinguishable.

-There will be greater activity in biological systems and interaction with engineering.

- Environmentally-sound technologies will be a driver or major component in future advances.
- Increased computing power, bandwidth, and miniaturization will influence the technology for information access and dissemination.

IV. Relevance to the Department of ECE

A number of the trends identified is expected to have a material influence on engineering education. The reduction in the length of technical careers and the growth of technical professionals outside of N America and Western Europe will directly affect enrollment and student profiles and hence their educational needs. There will be a greater need for training that facilitates career changes. The “flattening” of the world due to the internet will increase the number of centers of technical excellence and their accessibility to many more people globally. This will intensify the competition for engineering departments.

Engineering will continue to be more interdisciplinary (especially with biological systems) making it increasingly more important that students develop teaming, communication and collaboration skills. A related trend is the gradual dissolution of boundaries between disciplines which will accentuate the perception that the organization of academic departments is archaic and anachronistic. In the long arc of academic history “specialization” has been the trend which has meant deep penetration within a narrow discipline often in an isolated environment by a single expert. In the present day specialization means expertise in a multi-disciplinary enterprise in a diverse and more global environment where collaborative solutions are demanded.

Perhaps because the information is dated, several important trends were not mentioned or were only implicit. To wit, little was said about the trend to cloud computing and storage, cyber security, big data, privacy and IOT, among others. Nonetheless the trends identified appear to continue to be in play.

V. Recommendations for the Department or the IAB

There are many trends to follow and to which to respond. It is not recommended to develop a response in a piecemeal fashion. The

recommendation is for the Department with the help of the IAB and other resources to develop a long-range strategy taking account of the trends already manifest and outlined by the IEEE source, but updated by credible futurists. It would start with a 2025 vision, then followed by five and ten year goals which should be updated every other year or so. The goals would indicate actions needed in the short term needed to be successful in achieving the 2025 goals. The IAB could assist in this process by helping to provide high quality information relevant to the development of a long range strategy.

I would note that the five Grand Challenges enunciated by the National Academy of Engineering already address a number of the trends outlined in this source. It is possible that the Challenges could serve as the seed for a 2025 vision.

VI. Contact Information

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