
Universities & S&T Expectations Conditions for Success

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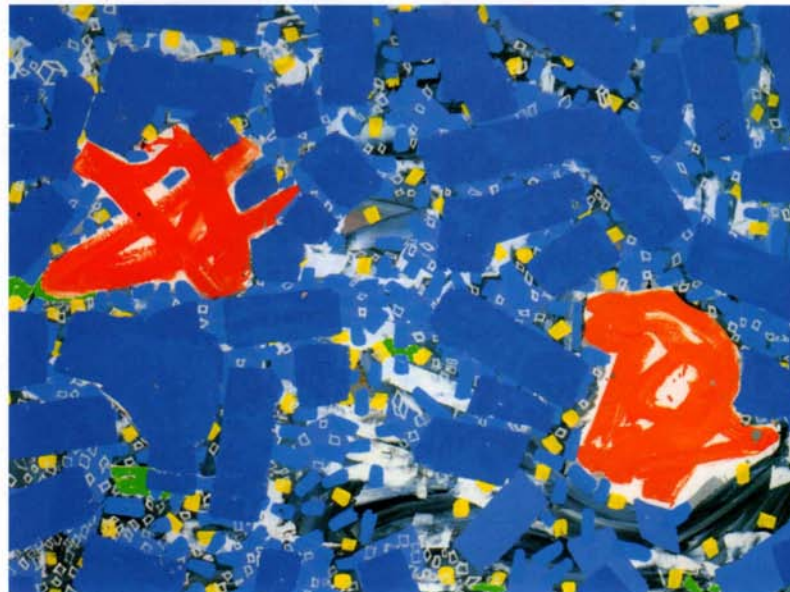
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This book, other documents, and many private conversations inform this talk.

University Research for Innovation

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Recent comments from practitioners of S,T, D, and Commercialization

- **Prof. Robert Byer - Stanford Applied Physics**
‘Stanford’s major contribution to Silicon valley has been students’
- **Dr. Curt Carlson - President SRI International**
‘The innovation process today is simultaneous idea to product’
- **Hertz Foundation Fellows - graduate students in engineering & applied physical sciences. ‘Starting a business is hard, about 15% of us try it’**
- **Vinod Khosla - Indian-American - very famous VC in Silicon Valley**
‘20-29 year-olds have the ideas and a few 45 year-olds run the companies’
- **H. Klagges - Entrepreneur Munich - Enough money, smart employees, legal and financial terrain are easier to deal with than in the past.**
- **W. Tadros - Pakistani-American - Succeeded as an entrepreneur in America because of enforced financial and IP laws and honest judges**

Countries want their Universities to generate wealth, job growth, social harmony, and pride.

- **Universities are complicated social entities built on 60 year old ideas regarding S&T performance (and >120 year old social ideas).**
- **Expensive and hard to change.**
- **Difficult to interface with the competitive center**
- **Famous universities create a special “life of their own” .**
- **They are the main source of educated personnel to lead modern governments and businesses, but not as production workers.**

A Research University, to be acclaimed for its S&T performance, needs recognition from many parties

- **Public funded Universities need to show value, ~ 100 yrs for UC:
e.g., political, society, productive-sector leaders, bureaucrats,...**
- **Privately funded Universities need to show value to their, non-state-sector management, it takes time ~ 50 yrs for Stanford:
Boards of directors, donors, bill payers, student body, industry**
- **Positive reports from local and international S&T leadership**
- **“Votes” from Industrial sector representatives as they search for both domestic and foreign talent from the “best” universities.**
- **Universities provide services to members of society :
re: job growth, skilled graduates, community service, and
today re: **innovative ideas that matter on an international scale****

Society has an equal responsibility to provide a supportive environment to foster S&T excellence

- **Long term support for education - from kindergarten through universities - the role of governments**
- **Master planning and “rolling” 10-20 year support, e.g. U. of California has succeeded because of such planning**
- **A well designed and managed intellectual property and legal infrastructure to enable S&T transfer with little interference**
- **Removal of “value subtracting” bureaucracies**
- **Encouraging attitudes that support risk taking, career changes, some failures, and significant individual rewards for exceptional performance**

My conclusions regarding the role of the S&T-University, the Innovation-Sector, and Industry are:

- Almost every human activity will change completely in the next 50 years => **There is a more than enough work to be done by all.**
- The University has been the source of an overwhelming number of the 20th century's basic ideas - especially in S&T, but also in most other social arenas. **This must continue.**
- Conflict exists between those mastering history (i.e., past practice), those proficient in professional present-practice, and those innovators creating future value, these need to be resolved for public sector Universities.
E.g. Faculty promotions, ethics of starting companies, legal ownership of property,.....
- Industry has been especially effective in using and supporting new ideas pertaining to its market objectives - **they continue to look to Universities for talent and many ideas, but not for their work force.**

“Innovation societies” are needed to meet human needs, much work remains to reach this level.

- Interactions between the Industrial, Governmental, & University sectors have been too complicated and stacked against innovators in most countries -
New, seamless government and legal procedures are needed.
- Societies need “ mid-wives* ” to make the innovation process work
- **I contend that:**
A venture-based industrial-sector provides the “mid-wife service” , and in fact is required to grow S&T ideas into modern industries

***Mid-Wife: A practical nurse who helps with the birth process**