

Winning with Innovation



A Technical Perspective

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About the Consumer Electronics Society

- Founder chair of the Bangalore Chapter, started in 2010
 - Awarded “Best Chapter” of the year, 2014, by IEEE section
 - Advanced Graphics (GFX) workshops being held every year, since 2011
 - The goals of the chapter are to: –
 - 1. Help current CE practitioners improve their capabilities, and lead to further fundamental CE research and development in the Bangalore area, and India in general
 - 2. Mentor and groom the next generation of CE Engineers by working directly with local and national Engineering Colleges and Universities.
 - 3. Provide a common platform for CE organizations to share experiences and knowledge, and create common India specific standards in the longer term.
- ==> Please plan to join IEEE CE Society as a volunteer, member !!

The Innovation Pipeline

- Expertise ==> Identification of Problem ==> Analysis of Solutions ==> Implementation ==> Feedback and Improvement cycles
- Importance of Ecosystem to Innovation
 - Strong educational system
 - Quality of Research institutions
 - Thrust of Private sector
 - Law and Governance
- Location – does it matter ?



Location – Does it matter ?

- Silicon Valley
 - Apple, HP started in Los Altos
 - Today
 - Garage will cost ~ million USD
 - 2300 USD median rent
- Sustainable ?



Why not ?

- India, Karnataka, Bangalore, Mysore

	Ranking		Performance	Funding	Market Reach	Talent	Startup Exp.	Growth Index
Silicon Valley	1	↓	1	1	4	1	1	2.1
New York City	2	↑ 3	2	2	1	9	4	1.8
Los Angeles	3	↓	4	4	2	10	5	1.8
Boston	4	↑ 2	3	3	7	12	7	2.7
Tel Aviv	5	↓ 3	6	5	13	3	6	2.9
London	6	↑ 1	5	10	3	7	13	3.3
Chicago	7	↑ 3	8	12	5	11	14	2.8
Seattle	8	↓ 4	12	11	12	4	3	2.1
Berlin	9	↑ 6	7	8	19	8	8	10
Singapore	10	↑ 7	11	9	9	20	9	1.9
Paris	11	↓	13	13	6	16	15	1.3
Sao Paulo	12	↑ 1	9	7	11	19	19	3.5
Moscow	13	↑ 1	17	15	8	2	20	1.0
Austin	14	NEW	16	14	18	5	2	1.9
Bangalore	15	↑ 4	10	6	20	17	12	4.9
Sydney	16	↑ 4	20	16	17	6	10	1.1
Toronto	17	↓ 9	14	18	14	15	18	1.3
Vancouver	18	↓ 9	18	19	15	14	11	1.2
Amsterdam	19	NEW	15	20	10	18	16	3.0
Montreal	20	NEW	19	17	16	13	17	Compass

Pace of change of Technologies



One of these companies contributed significantly to MP3. Which one ?

Research - Fundamental vs Applicative Subjects

- Foundational subjects are complex, heavy and lead to fundamental breakthroughs
 - Mathematics, Physics ==>
 - Signal Processing, Information Theory
 - Convergence of many fields in the future
 - Material science, Quantum theory ..
- Applications are easy, and pace of change is dramatic
 - G726 speech decoders
 - MP3 audio decoders
 - MPEG video decoders
 - Cloud APIs and software
- Both have their places in today's world, but be prepared to change application domains every few years

Summary

- A long career in research requires planning, investment but is more rewarding
- Applicative technologies are easy to get into, but even more easier to get beaten out
- Collaborative ecosystem is key to technological innovation

