

# *Academic Research Practices in Communications Technology: Indian Perspective*

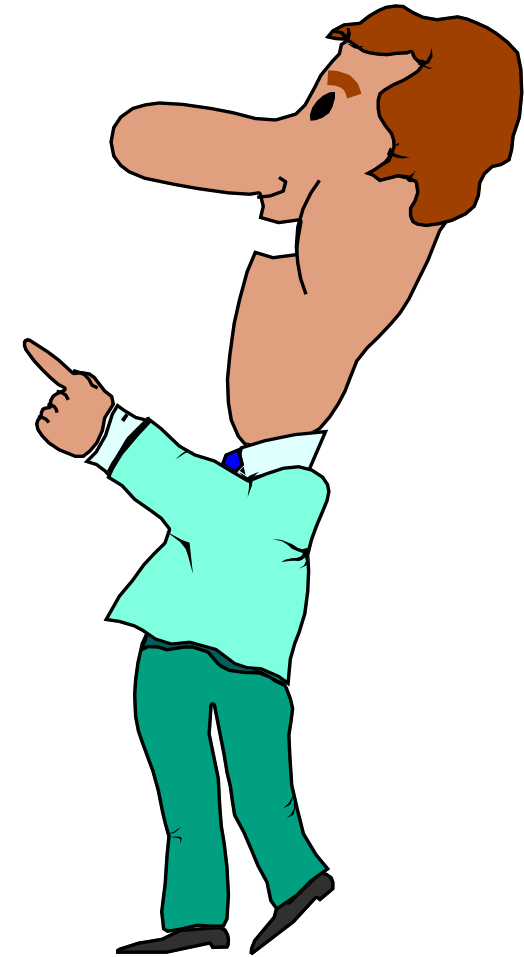
Debashis Saha

*IIM-Calcutta,  
Joka, D. H. Road, Calcutta 700 104, India*  
[ds@iimcal.ac.in](mailto:ds@iimcal.ac.in)



# Good Morning !

Please ask questions at the end of  
the talk



# Disclaimer

- This is my personal observation only
- This is pertinent to Indian Universities only
  - *It excludes Industry R&D, IIX's or IISX's, or IISXX's of India*
- There are exceptions and those are excluded
- I talk about Communications Tech. field only
- No malice intended to anybody or any institution

Is there anyone who hasn't  
published a paper?

*Please raise your hand*



# Are all of you aware of –

- Citation count
- h-index/g-index
- Impact factor

# What are they ?

- *Citation count & h/g-index* are the quantitative measures to assess the value of a researcher's output
  - *Not the paper count any more*
- *Impact factor* is a measure of the frequency with which the average article in a journal has been cited in a particular period.

# Citation Count

- **Citation** is the process of acknowledging or citing the author, year, title, and locus of publication (journal, book, or other) of a source used in a published work.
  - *For example, references in a paper*
- Such citations can be counted as measures of the usage and impact of the cited work.
  - *This is called citation analysis or bibliometrics.*

# How to Count Your Citations

- Go to “Google” or “Google Scholar” & search as ‘citation count of debashis saha’
  - *This is a crude method*
- Go to the Web of knowledge at ISI/Thompson Reuters <http://www.isiknowledge.com/>.
  - *This is a commercial site but most universities have a subscription.*
    - **Click on ‘advanced search’ with your name**



# Tutorial on Citation Count

---

- <http://planets.ucf.edu/resources/citation-counts>
- <http://www.lib.utexas.edu/chem/info/cited.html>

# h-index

- *Hirsch index* was suggested by Jorge E. Hirsch, a physicist at UCSD.
- **h-index** measures both the productivity and impact of the published work of a scholar.
  - *It is based on the set of the scientist's most cited papers and the number of citations that they have received in other publications.*
- A scholar with h-index equal to “ $n$ ” has published at least “ $n$ ” papers each of which has been cited in other papers at least “ $n$ ” times



# How to measure your h-index?

- Use this free software “**Publish or Perish**”  
– *<http://www.harzing.com/pop.htm>*
- Install in your machine and run
- You need the Internet connectivity



# Impact Factor (IF)

- It is a measure to judge how good a journal is
  - *It is frequently used as a proxy for the relative importance of a journal within its field*
- Journals with higher *impact factors* deemed to be more important than those with lower ones
- Publishing in a journal with high *impact factor* increases your chance for higher citation count and hence higher *h/g-index*

# Why these measures ?

- Most of the “research” papers, though archived, are hardly read by anybody, including the authors themselves, post-publication.
- Sometimes the authors, not to speak of others, do not care to remember even the titles of their own papers once the **purpose** is solved.



# Purposes [Indian Context]

- Under-grads
  - *Citing those papers while applying abroad for higher studies*
- Post-grads
  - *Strengthening their resume*
    - **While applying abroad for higher studies, or while applying for teaching jobs**
    - **For promotions**
- Doctoral students
  - *For thesis work and/or promotions*



# Driving Factors for Research

- Mostly people choose to do some research in India out of *academic compulsion* rather than research penchant.
- It's either taken up to supplement one's career or to get better job opportunities.
- Again, I am talking about Communications Technology only
  - *This may be true for some other disciplines too !*



# Not A Wrong Approach

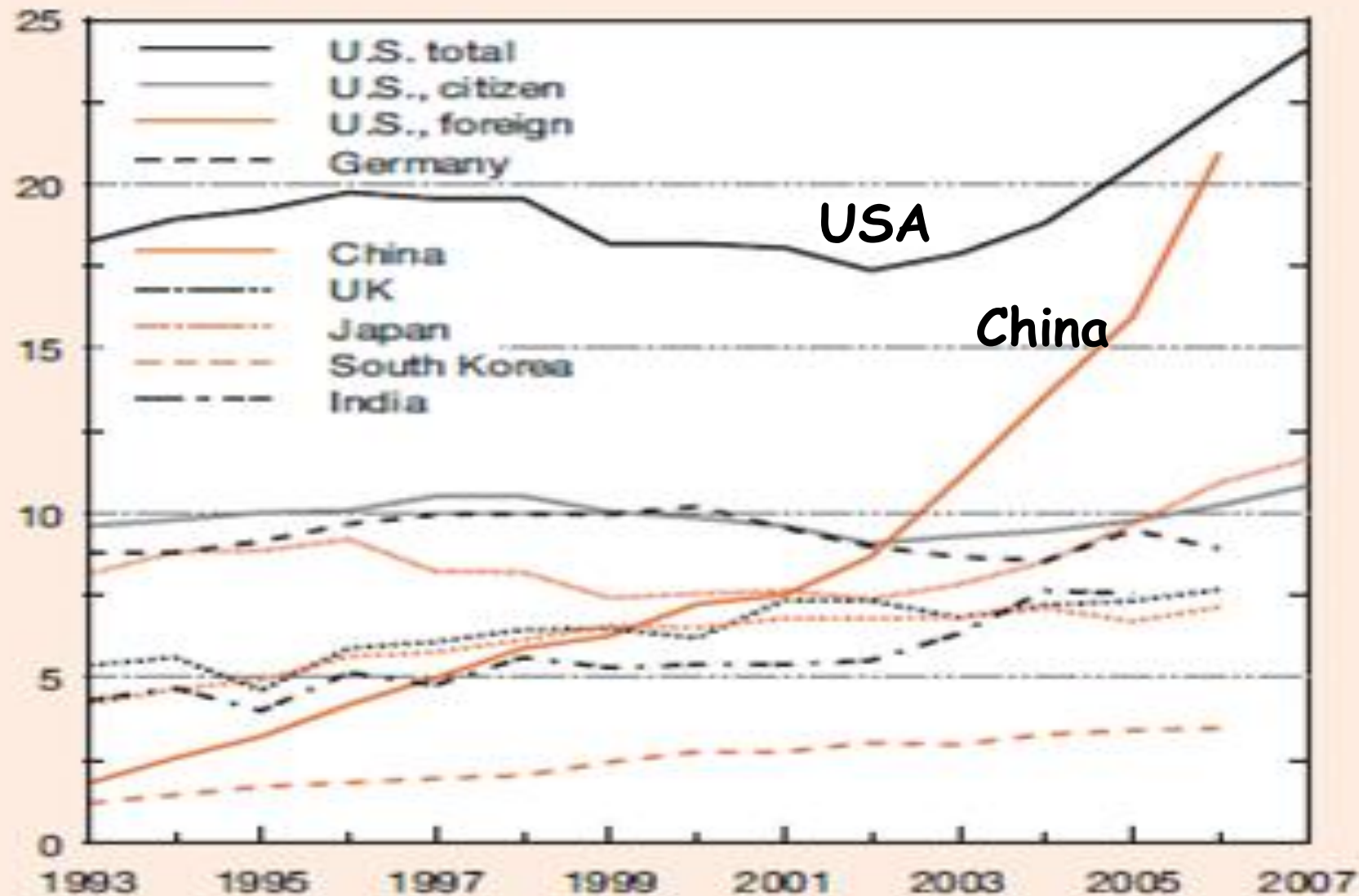
- There is nothing wrong in the purposes/driving forces
  - *Market demand can't be ignored*
- But, India need more “quality” research output
  - *More PhDs to be more specific*

# Hard Facts

- Though India churns out ~ 15,000 PhDs on an annual basis, research work in the country remains pitiful both qualitatively and quantitatively.
  - *5000 in Science,*
  - *4000 in Arts,*
  - *1000 in Agriculture,*
  - *1000 in Engineering,*
    - *Out of them, may be 100 in Communications Tech*
  - *1000 in Commerce,*
  - *500 in Education.*
  - *250 in medicine.*

# Doctoral Degrees in Natural Sciences & Engg.

Thousands



# 2008 Data on China

- By 2008, it had already surpassed the US as the world's top producer of PhD holders
  - *despite postgraduate programmes only resuming in 1978 after the turmoil of the Cultural Revolution.*
- The number of PhDs, the Chinese plan to graduate, within the next 10 years is greater than the entire population of Canada !!!

# A Different Chinese Threat

- National Knowledge Commission (NKC) report 2009 reveals that
  - *The growth in the number of doctorates in India is a mere 20% as compared to 85% in China!*
- We can't beat them on scale. We have to do it by **smarts**. The only way to get ahead of this Chinese tsunami is to invest in **quality**.
  - Source: [<http://timesofindia.indiatimes.com/india/China-overtakes-India-in-PhDs-too/articleshow/4713588.cms>]



# India's Strategy

- To concentrate more on “quality” than on “quantity”
  - *Moving up the value chain*
    - **Doctoral students produce quality theses**
    - **Masters students produce quality dissertations**
    - **Undergrad students produce quality project reports**
- Everybody should target to publish high quality papers in quality Conferences/Journals with high Impact Factors
  - *Beware of the mushrooming of so-called “open” journals with no pedigree*
    - **Stay aloof from plagiarism**
- Internet is the big “watch dog”



# That's why you should be aware of –

---

- Citation count
- h-index/g-index
- Impact factor

# Quality is the Key

- Citation count, h/g-index
  - *Measures of quality*
- How to address ‘Quality’?
  - *What are the thumb rules ?*
- Let’s begin with current status and bare some hard truths in Commun Tech research arena

# Current Status

- Commun. Technology research concentrates more on “algorithmic” solutions
  - *Product orientation is very much missing !*
- Half-hearted approach and half-cooked patchwork towards problem formulation
  - *Which doesn't add to a good research paper*
- In fact a lot of research topics taken up at the undergrad level are “frivolous”
  - *Hence have zero “contribution value” to the literature.*



# Indian Practices (1)

- Picking up a soft problem
  - *You never know what exactly the problem is and why the problem is difficult to solve*
    - **Is it really a problem at all?**
      - Convince yourself first
- Sometimes it is equivalent to reinventing the wheel
- On the contrary, sometimes the problem is too hard to be solved in the given time frame!
  - *Undergrad (1 yr), Post-grad (1.5 yr), PhD (3 yr)*



# Indian Practices (2)

- Problem first, application later on (if exists)
  - *what's the use of solving those problems*
    - **Weak industry-academia link**
  
- Solve somehow, practicability doesn't matter
  - *Impractical solutions are of no interest to industry or other researchers*
    - **Again, implementability is ignored**

# Indian Practices (3)

- No lateral thinking, no out-of-box approach
  - *All mundane style, cliché type experimenting*
    - **Students don't enjoy it at all !**
- Result: the candidate herself/himself forgets about the paper, not to speak of others
  - *Very few continuities in research*
    - **Scattered contribution ! No linkage !**

---

# Analyzing the Situation

## Myths vs Realities

# Survey $\neq$ Google search

- Myth: Survey of existing works can be done in minutes with Google search.
- **Reality**: It takes hours to search through Digital Libraries and websites to analyze the gap area.
  - *How the problem has evolved over the years?*
  - *What are the current best results in this problem domain?*
    - You need to compare your results with those

# Problem Formulation >> Solution

- Myth: Solving the problem is more important than formulating the problem.
- **Reality**: This is true only for classical problems which are already formulated. For most of the papers, problem is never formulated but solved!
  - *Using some existing solution techniques (either heuristics or meta-heuristics)*
    - **Where is the contribution?**

# Simulation vs Mathematical Analysis

- Myth: Simulation is enough, mathematical analysis is additional.
- **Reality**: Simulation is there only to complement mathematical analysis where closed loop solutions are intractable.
  - *Simulations must be validated !*



# Conclusion $\neq$ Summary

- Myth: Summarize the paper in the last section named “Conclusion”.
- **Reality**: You need to conclude your work in this section. Don’t repeat the discussion on results.
  - *Learn the difference between “Discussion” and “Conclusion”*
    - **Most of the time we confuse them while writing papers/theses**



# Writing a paper

- Myth: Research paper = 90% results + 10% presentation.
- **Reality**: Research paper = 10% results + 90% presentation.
  - *You need to make the others (including reviewers) appreciate the results obtained*
    - **Rather than flooding the paper with repetitions, unnecessary graphs and tables**
      - Typos are most irritating !!



# Admitting >> Hiding

- Myth: The more you hide, the higher the chance of acceptance.
  - **Byproduct: Plagiarism (even self-plagiarism is injurious to citation count)**
- **Reality**: The more you hide, the less the importance and the archival value.
  - *You can fool the referee temporarily, but you cannot pass the test of time*

---

# Research Culture

We need changes here too

# Two Way Traffic

- Myth: It's a one way learning exercise from supervisor to student.
- **Reality**: It's a collaborative learning; so do encourage both way traffic.
  - *The supervisor learns from the student as much as the student learns from the supervisor*
    - **Though the levels are different**

# Supervisor $\neq$ Dictator

- Myth: Obey your supervisor religiously without asking even the most valid question.
- **Reality**: Follow the directions pointed at by the supervisor, but weigh other nearby options too.
  - *Learn to think in your own way*
    - **You will be a supervisor one day !**

That's all for today

# Conclusion

- Myth: What I say is sacrosanct.
- **Reality**: Challenge each and every word until and unless you are convinced !

– *So questions please*

- ???????

# Your Comments are Most Welcome

---

Please feel free to write to me:

[ds@iimcal.ac.in](mailto:ds@iimcal.ac.in)

