Innovative Research

Prof. V. Radhakrishnan

vpradha007@gmail.com
Scheme of Presentation

• Why, do research?
• Research – Academic and Real world
• Points to remember
• Prerequisites for Research
• Some useful hints
• Innovative Research
• Conclusion
A Word of Caution

If there is any similarity in your research experience with some of the statements given in this presentation, it is but natural.

Please do not get offended by any of these statements. They are all from my real experience in research and research supervision.
Why do research

To solve an existing problem.
To improve the performance of a product / process.
To benefit the society in the long run.

To prepare ourselves for future research careers.
To train ourselves in doing a well planned activity.
To get funding to sustain our existence.

Research is often about finding questions than answers.
Types of Research

- Academic research
- Real world research
Research for the sake of research!

It starts with searching for a problem!

This could be a real-world one or an imaginary one.

The selection of the problem to be addressed depends on the supervisor who will often have the final say.
Academic Research

Progresses in a systematic fashion.
Looks for standard problems and standard tools
Aims at “Safe research”
Most of the frustrations come from
Equipment, Software, Supervisor, etc.
Very rarely from the problem in hand!
Academic Research

• Contributions are often marginal.

• They are often highlighted as gains and never as failures.

• Curtain is down after report preparation and publication.
Real-world Research

An existing problem is identified.
Its relevance from various angles is studied.
Priority for research is ascertained.
Looks at competing solutions.
Systematic study and research using standard as well as innovative approaches.
Real-world Research

Prepared for failure and eventual stoppage.

Aware that others are also smart.

Success is often quantified in terms of rewards, revenue and benefits.

Curtain is down only when all benefits from the study are achieved, often resulting in a product, process, or method.
Points to remember

• In research, like in all other areas, taking risk is always rewarding.

• If you follow the beaten track you will only step on things left by others.

• Innovation means to focus on ideas that change the basis of competition.
Prerequisites for Research

Very good understanding of the area
Familiarity with tools and methods
Imagination and visualization
Experience of relevance
Balanced curiosity
Lateral thinking
Maturity and Honesty
Intuition
Prerequisites for Research

• High intelligence is desirable.

• But not a prerequisite for making great contributions.

• However independent thinking is.
Some useful hints

• To do successful research you need not know everything

• You just need to know one thing that is not known
Some useful hints

• Conservative concepts act against innovation.

   “A bird in hand is worth two in the bush”

• Reluctance to try new concepts will stagnate and outdate the system.

• An outdated system will never be competitive and innovative.
Some useful hints

- It is a capital mistake to theorize before one has sufficient data.

- Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.
Some useful hints

• Expect failures on a grand scale and you are in a win-win situation

• Never fear to attempt a new idea.

• Doubts makes us the losers by fearing to attempt.
A tradition of innovation is a curious thing:
- a stubborn, unchanging habit of embracing the new and surprising.

Creativity is the thinking of novel and appropriate ideas.

Innovation is the successful implementation of those ideas.

In other words, creativity is the concept and innovation is the process.
Innovative Research

Be on the look out for new ideas
( often old ideas do come back)
Look for solutions available in similar areas
Try solutions like:-
“If you can’t beat them go with them”
“Your enemy’s enemy is your friend”
Innovative Research

Have a look at developments in areas which are remote to your study.

Look at the less endowed.

Observe nature where the full spectrum of knowledge is working in an integrated fashion.
Spent more time on thinking rather than doing. Most of the difficulties can be overcome by applying brain than brawn.

Remember that no road leads to a dead end. You can always retreat.

Once an idea is struck allow it to mature. But remember - often they are impracticable.
Innovative Research

Real world research

- 1,000 raw ideas
- 100 considered viable
- 10 Product ventures
- Half of this fail in the market

Academic research

- 1000 raw ideas
- 50 are workable
- 5 may work
- 1 succeeds
Innovative research means freedom to do research based on one’s ideas and convictions.

The supervisor should supply the resources and a certain amount of direction and then get out of the way.

Innovative researchers are often those who have occasionally circumvented their supervisors and succeeded.

Intellectual insubordination is often an inevitable ingredient for innovation.
Frustration acts against innovation.

When forced to retreat smile for a while - in fact you have learnt a lesson out of that.

Unsympathetic surroundings are a major deterrent to creative work.
Innovative Research

- Innovative ideas are generally very simple.
- But simple ideas do not strike often.

Have you ever thought like this?

A hen is only an egg’s way of making another egg – Samuel Butler
Innovative Research

- Innovation needs realistic thinking.
- This needs a change in the mindset with a firm foot on reality.
- Answer to What happens after death?
Innovative Research

- Innovation does not always mean totally new ideas.

- It is how one uses a known idea in a new environment, effectively.
Patenting is a double edged sword. It safe guards your innovation but often puts a brake on further enhancement of that idea.

It is more a business proposition than research requirement.
Innovative Research

To get the most from your research, you need to move quickly.

This gives recognition and impact.

This is all the more true in emerging areas than in traditional fields.

Consolation is that these areas are the ones that have emerged from traditional fields.
Conclusions

It is interesting and absorbing to do innovative work.

There are always alternative solutions to a real life problem.

There is a good amount of risk involved in innovative research.

Take a plunge and you should be a winner.
Concluding Remark

• When we are innovative, others never know what we are going to come up with next.

The fact is, neither do we.