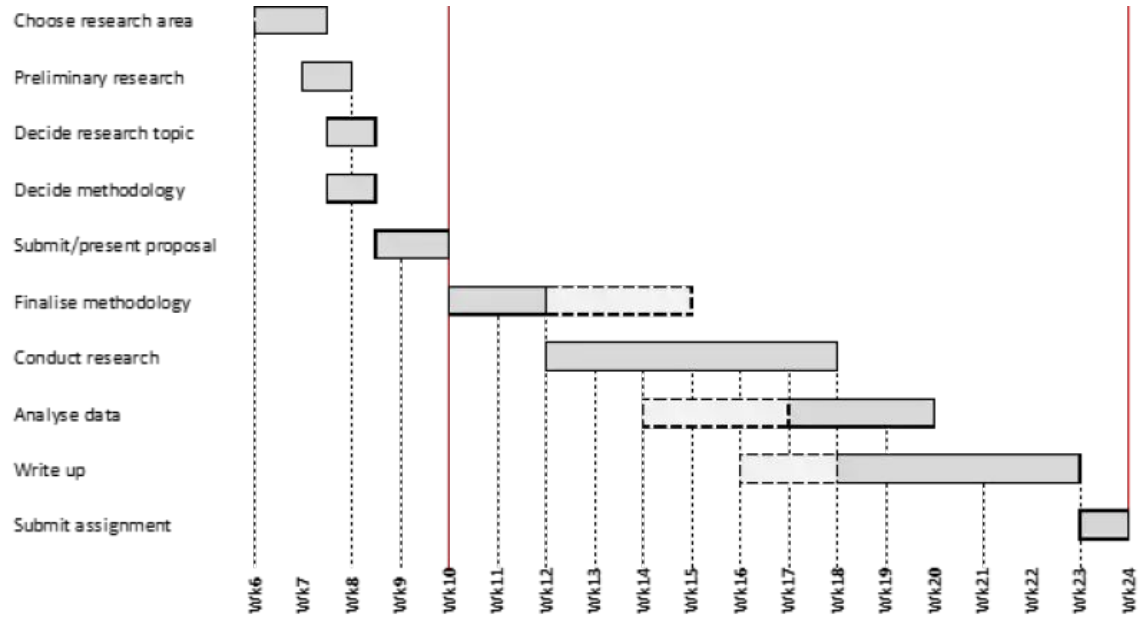# Research project

Arun Kumar Rajasekaran

Let's think about timeline

Is there a hard rule?

Starting a research project

1. Choose your research area

WHY did you choose the topic? What interests you about it? Do you have an opinion about the issues involved?

WHO are the information providers on this topic? Who might publish information about it? Who is affected by the topic? Do you know of organizations or institutions affiliated with the topic?

WHAT are the major questions for this topic? Is there a debate about the topic? Are there a range of issues and viewpoints to consider?

WHERE is your topic important: at the local, national or international level? Are there specific places affected by the topic?

WHEN is/was your topic important? Is it a current event or an historical issue? Do you want to compare your topic by time periods?

If you plan to propose an original topic, here are some tips to guide you:

- Read a wide range of materials to find a subject that you are passionate about.
- Immerse yourself in journal articles and theses associated with your topic.
- Narrow your focus to a single research question. Be specific, original and realistic about what you're able to achieve.
- Take a flexible approach. As your research develops, it is likely that some of your initial ideas will be challenged. You might need to change or modify your question if necessary.
- Make sure you stay up-to-date with the most recent developments in your field. This will ensure your idea is achievable and that it has not already been addressed by another researcher.

2. Conduct preliminary research (scope out the topic)

Survey current research surrounding your chosen subject area.

Reflect on it carefully, and take advice from academic staff to establish what has already been written on your chosen subject area.

This will enable you to identify what you can do that has not been done before.

3. Decide your research topic

Clearly define and delineate your research topic.

The more clearly you do so the more confidence and clarity you will have in what you are trying to achieve, and the easier it will be for you to monitor your progress.

If you're uncertain what you're trying to achieve, how will you know whether you're on course or not?

3. Decide your research topic

At this stage you might also formulate a provisional research question – that is, the question your research will answer:

Research topic: Investigate 'A' and 'B' to see if/how they interrelate.

Research Question: 'To what extent is A caused by B?'

4. Decide your methodology

The research methods you use depend on the type of data you need to answer your research question.

- If you want to measure something or test a hypothesis, use quantitative methods. If you want to explore ideas, thoughts and meanings, use qualitative methods.
- If you want to analyze a large amount of readily-available data, use secondary data. If you want data specific to your purposes with control over how it is generated, collect primary data.
- If you want to establish cause-and-effect relationships between variables, use experimental methods. If you want to understand the characteristics of a research subject, use descriptive methods.

4. Decide your methodology

Overview: Choosing Your Methodology

Understanding the options

– Qualitative research

– Quantitative research

– Mixed methods-based research

Choosing a research methodology

– Nature of the research

– Research area norms

– Practicalities

1. **Nature of the research**
   1. Exploratory
   2. Confirmatory
   3. Combination

2. **Research area norms**
3. **Practicalities**
   1. Data access
   2. Time
   3. Money
   4. Hardware and software
   5. Your knowledge and skillset

5. Submit/present your research proposal for approval

- Your main research question/problem/title
- Questions or concerns that will help you solve your main research problem
- A brief literature review or list of key texts/sources
- An overview of your methodology
- A timeline showing your main research project tasks

6. Finalise your topic and methodology

Revise your research plan in the light of feedback you receive during the approval process.
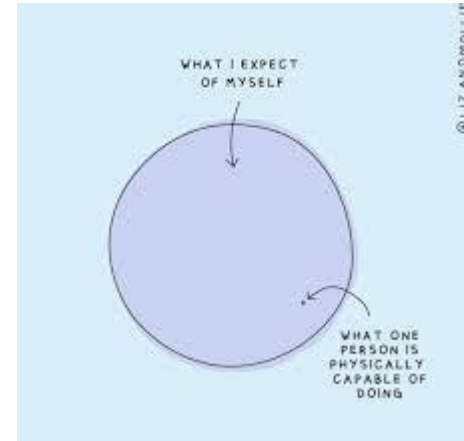
7. Conduct your research

EXPECTATION VS REALITY

SEPTEMBER ⟵⟶ AUGUST

WHAT THE HELL ⟵ [scribble] ⟶ IS HAPPENING

8. Analysis/data processing

9. Writing up

10. Submission

10. Future works (Journal writing / extending project)

Few initial writing tips

Organize your thoughts, ideas, and action in a logical manner.

Provide clear descriptions.

Simplify your word choices | Write concisely | Select the appropriate words.

Optimize paragraph and sentence structure.

Use transitions to control the flow.

Few more writing tips

Improve readability with consistent formatting

Maintain consistent use of labels, abbreviations, and acronyms

Use abbreviations and acronyms to aid the reader

Keep it short

Get the figures / tables right

Let's take a 10 min break and think about:

+ Forget about the deeper technical background
+ Imagine what could be your dataset (what you think you will get)
+ What could be some methodology used? (ML models?)
+ Where does the challenge lie? Data processing (or) hyperparameters?
+ Can you anticipate what type of data-processing or model hyperparameters you might be dealing with?
+ What's next?

Gantt Charts

A Gantt chart is a visual representation of a project schedule and a widely used tool in project management.
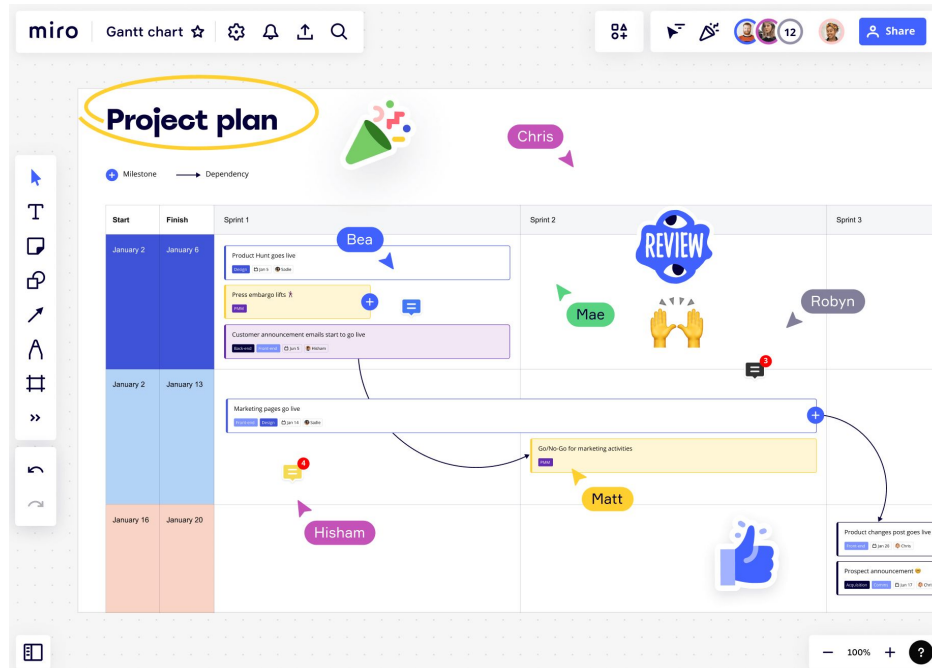
Gantt Charts

** Excel

Notion

GanttPro (Commercial)

Miro

~ Powerpoints and other office alternatives

Citations/ Bibliography/ Referencing

Endnote

Researchers waste nearly 2,00,000 hours/year formatting citation! This tool simplifies formatting bibliographies, finding impact of references and full texts.

https://endnote.com/

Mendeley

Creates references, citations, and bibliographies in multiple journal styles.

https://www.mendeley.com/

Semantic Scholar

Better than - Google scholar or Googling

~ AI powered relevant results

~ Citations

Literature Searching with...

Google Scholar VS SEMANTIC SCHOLAR

Here's what happened when I searched 'hyperreal in posthumanism' with no quote marks or Boolean operators

- 2660 results
- Top result is a paper that is highly cited but out of date
- 3 options to filter/sort results
- Clicking on paper brings up publisher's website for the source

- 5350 results
- Top result is a recent thesis on exactly this topic
- 7 options to filter/sort results
- Clicking on paper brings up Semantic Scholar page with abstract & related papers

Google scholar is not bad
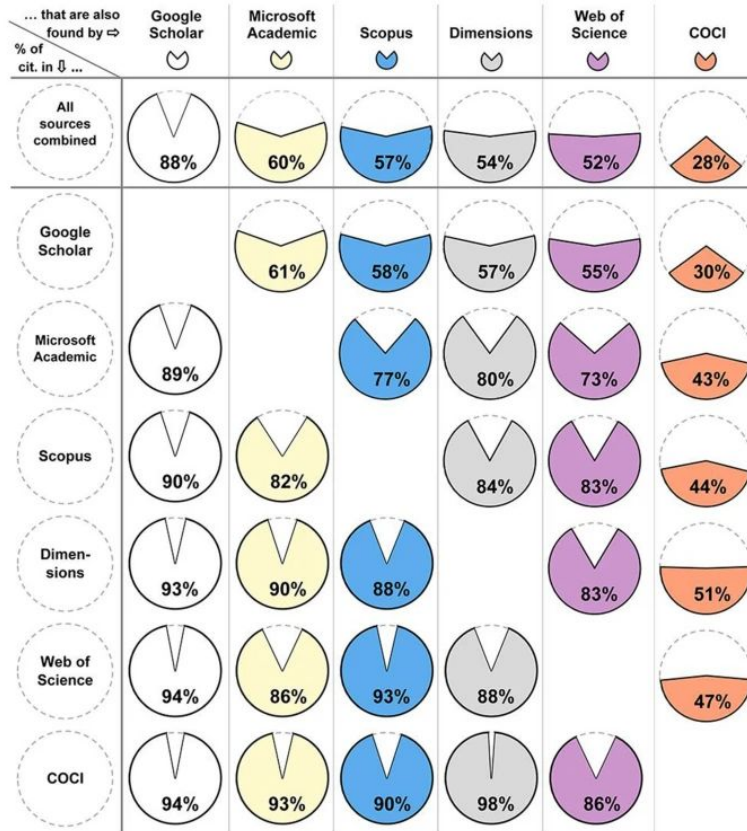
Martín-Martín, A., Thelwall, M., Orduna-Malea, E. *et al.* Google Scholar, Microsoft Academic, Scopus, Dimensions, Web of Science, and OpenCitations' COCI: a multidisciplinary comparison of coverage via citations. *Scientometrics* 126, 871–906 (2021). https://doi.org/10.1007/s11192-020-03690-4

Summarizing (not my best recommendation)

Scholarcy (Commercial) - Chrome extension is free

Elicit.com

Paper digest (still in beta)

tl;dr papers

science abstracts a second grader can understand

The glass cliff is a place where a lot of women get put. It's a bad place to be.

Elink.io

Enables you to save the content from around the web: articles, videos, cloud files, social media posts and share them with peers.

https://elink.io/
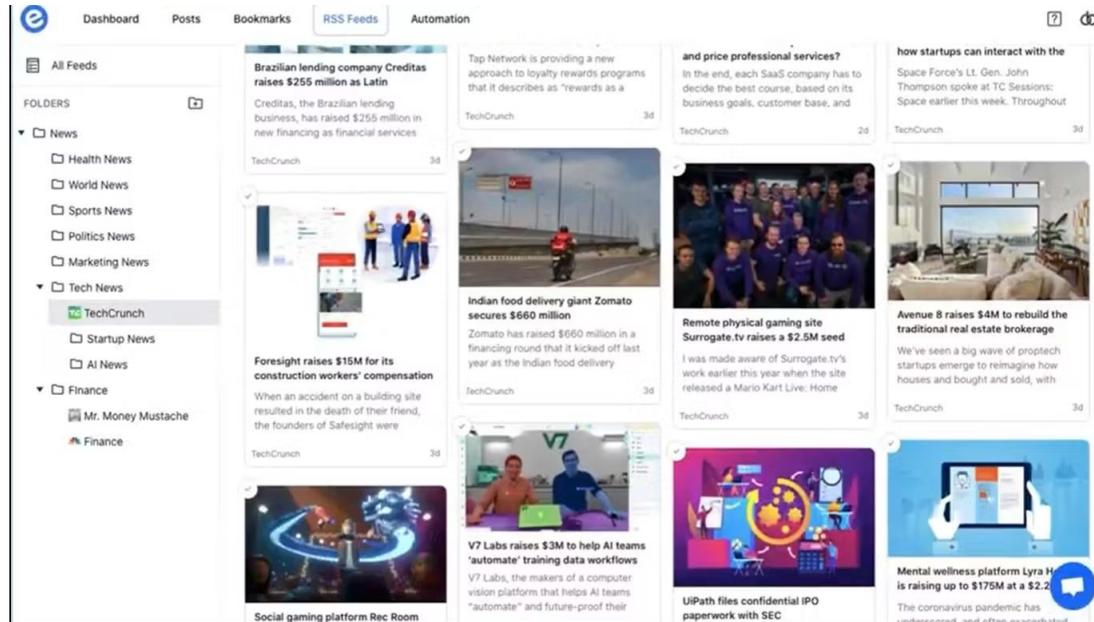
Searching without keyword

Another AI tool which helps you find relevant papers without perfect keyword match, summarize takeaways from the paper specific to your question, and extract key information from the papers.

https://elicit.org/

Some more unchecked AI

Scite

Allows researcher to see how publication has been cited by providing the context of citation and discover supporting and contrasting evidence for each paper.

https://scite.ai/

SciSpace Copilot

A multi-lingual AI tool, is helps you comprehend the paper (and the math and tables in it), seek answers to your queries, turn lengthy texts and sections into easy to consume summaries.

https://typeset.io/

One for excel/data analysis formula

✅Data Analysis

Excel Formula Bot. Converts your text instructions into spreadsheet formula.

https://formulabot.com/?view

Spell checking

1. Grammarly
2. ProwritingAid
3. WordTune

Unchecked writing assistants

<u>Trinka</u>

A grammar checker and language correction AI tool for academic and technical writing; finds errors unique to academic writing that other grammar checker tools may miss.

https://www.trinka.ai/

<u>Lex</u>

A text editor which helps you neatly store and format documents with simple prompts including references, headers and bulleted list.

https://lex.page/

<u>Scrivener</u>

A tool for long writing projects. It helps you fight page fright and writer's block by letting you write text in any order and find its place in the thesis later. Helpful in keeping your notes organized.

https://lnkd.in/dtXgAQnT