Politechnika Wrocławska

From research gap to methodology

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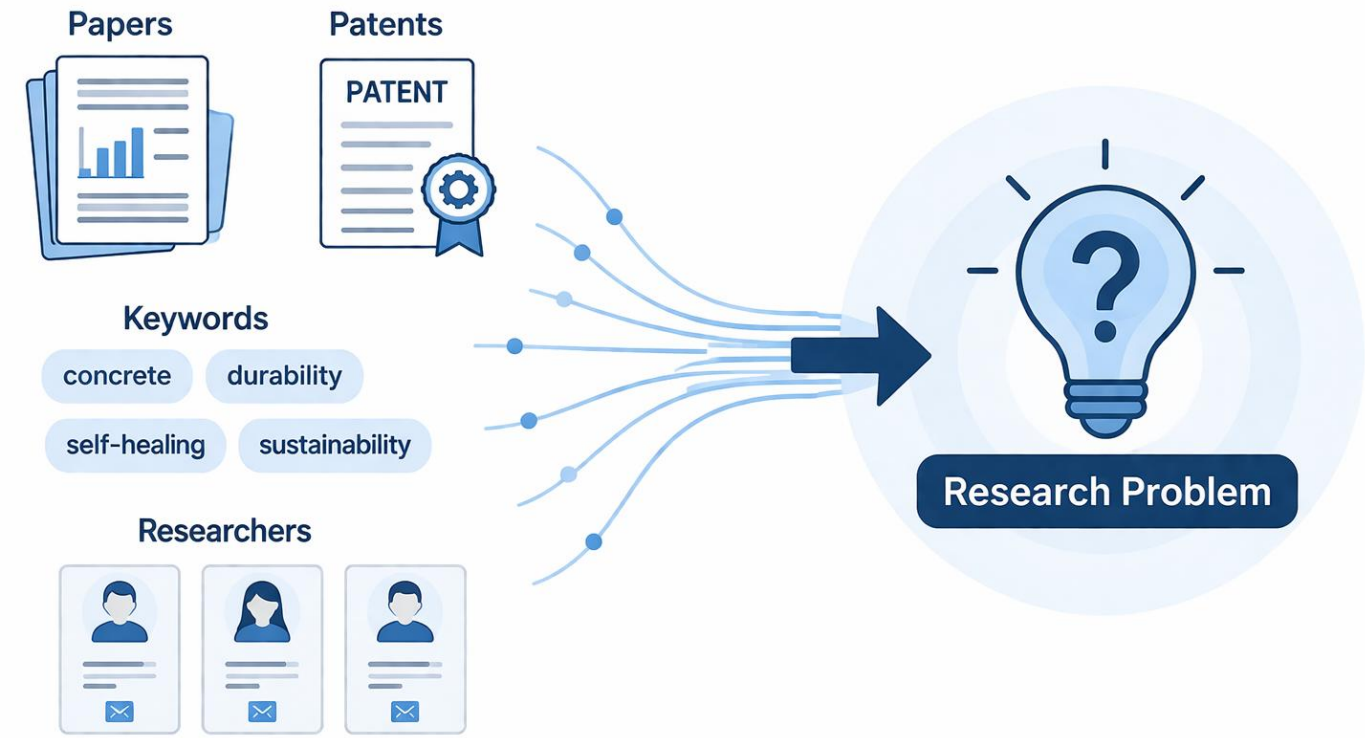
From searching to methodology

Last class you worked on:

- keywords,
- papers,
- researchers,
- patents.



Today: ***How to turn this into a research problem?***

From searching to methodology

Your research input (from last class):

- 4 keywords,
- 10 key papers,
- 3 researchers,
- 3 patents.

What keywords are you using?

What interesting things did you find?

Science

The definition of science:

„Science is one of the types of human knowledge.

In terms of cognition, it seems to be the best knowledge that describes reality most adequately.”

„Scientific research is the work undertaken by a researcher or team of researchers to advance scientific knowledge, establish new scientific theses, theses, axioms, generalizations and definitions”

Source: https://pl.wikipedia.org/wiki/Nauka

Scientific research

Research can only be undertaken when the aim is to do so:

- discovering so far undetermined new dependencies that have not been studied before,
- questioning the existing material and proving other dependencies,
- extending existing studies that have already been published
- updating (or confirming that they are still operational) existing studies and their results due to the significant passage of time and the possibility of their obsolescence.

Źródło: https://pl.wikipedia.org/wiki/Badania_naukowe

From literature to gap

What did you actually learn?

From your papers:

- What is already known? What is missing? What is unclear?
- Pair work (3 minutes)

Who found an interesting research gap?

Typology of scientific research

Typology of scientific research according to its purpose:

- **basic** - explaining phenomena not yet explored and discovering new scientific (not practical) laws,
- **applied** - using the results of basic research in practice,
- **implementation** - they consist in developing methods and techniques for applying research results in production (they are the final stage of the research cycle; the results of these studies are called innovations).

Patents = real world

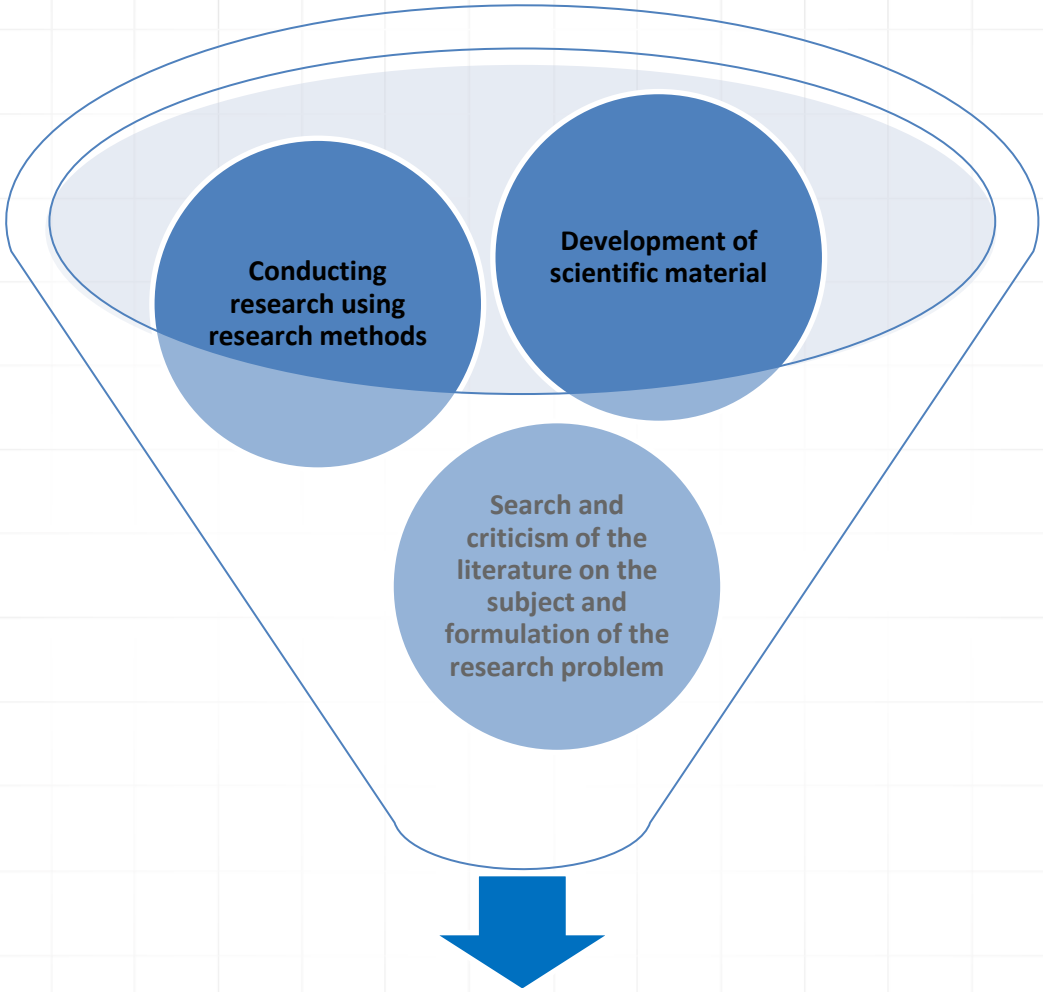
What did you actually learn:

- What do patents tell you? What is already applied?

  What problems are solved? What is still missing?

Does your topic make practical sense?

Scientific research process



Scientific research results

Research gap

Task: Define your research gap

Your gap should be:

- specific,
- relevant,
- based on literature.

Write 2–3 sentences

Research problem

Write your research problem in ONE sentence based on:

- literature,
- gap,
- application.

/3 minutes writing and exchange in pairs/

Research problem

If you cannot write it in one sentence,

you don’t have a research problem yet

Is your problem good?

Is it clear? Is it measurable? Is it new?

Conducting research

Resources needed to conduct research:

- Scientific research equipment,
- Software and licenses,
- Small laboratory equipment,
- Test materials (e.g. reagents, sample materials).

Ways of obtaining resources needed to conduct research:

- From the resources of the parent unit (Department),
- From faculty and university resources,
- From resources / laboratories of other entities outside Wroclaw University of Science and Technology.

The purchase of missing resources can be realized with external funds (e.g. research grants).

From research problem to methodology

How will you solve it?

- experiment?
- model?
- data analysis?

Why this method and not another one?

What happen within the next 3 months?

Write:

- 1 goal,
- 1 action,
- 1 risk.

/3 minutes writing and exchange in pairs/

Takeway

One thing I will improve after today:

_____

For next class:

1. To formulate a research problem in one sentence.
2. Determine the resources needed to conduct your research and how to obtain them.
3. Develop a list of literature sources showing how to conduct research and analyze data in the field of your research.
4. Develop a schedule for carrying out your research.
5. Develop a list of possible risks in carrying out your research.