CWTS
Meaningful metrics

Science-technology interactions: using NPLRs as glue

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Outline

- Research question
- STEM-fields and their interactions
- Research Orientation Focus
  - Overall dynamics
  - Two cases
- Concluding remarks

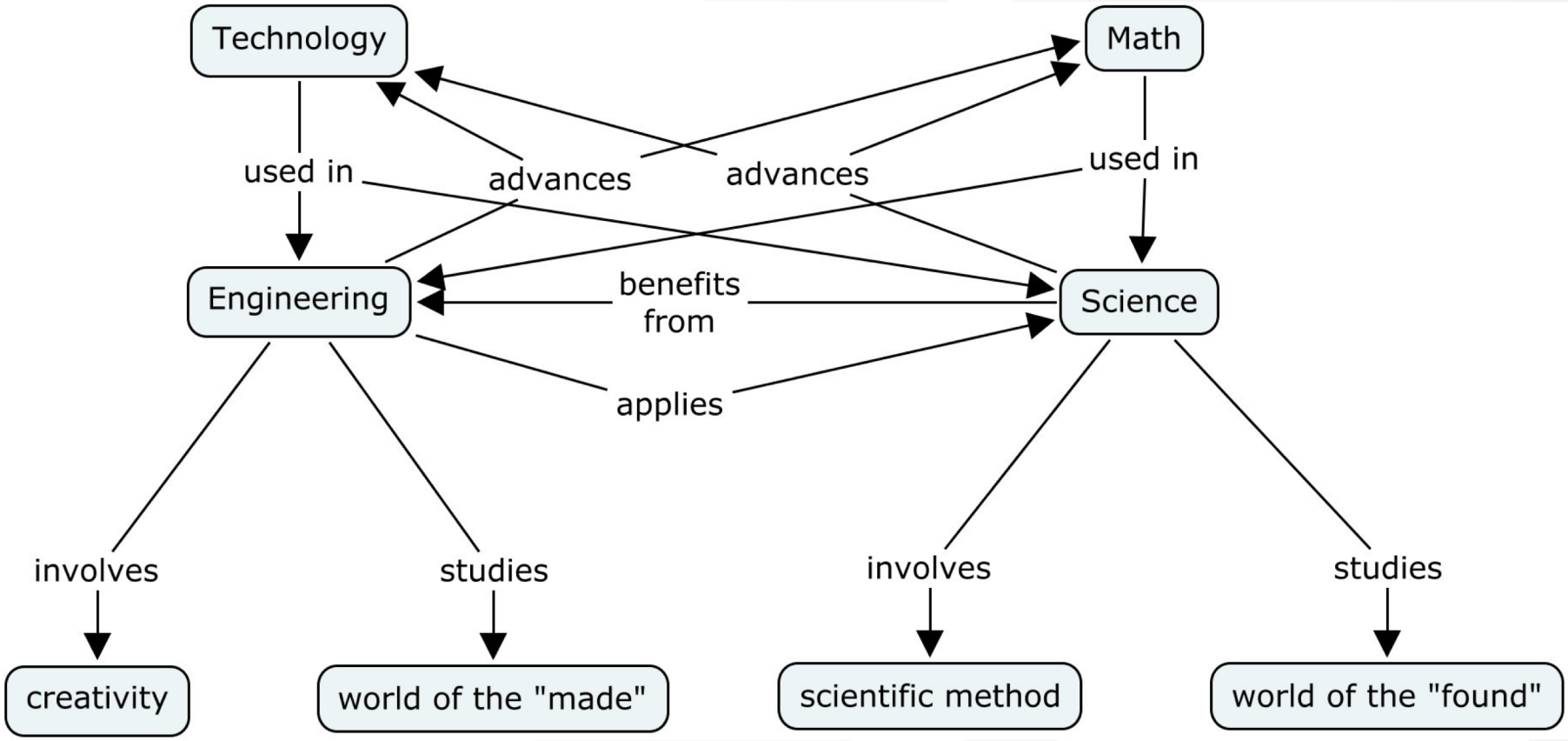
Research question

"Is the nature of the technology that supports science changing?"

We use the concept of *'Research Orientation Focus'*

Tijssen, R. J. W. and Winnink, J. (2016). Twenty-first century macro-trends in the institutional fabric of science: bibliometric monitoring and analysis. SCIENTOMETRICS, 109(3):2181–2194. 20th International Conference on Science and Technology Indicators (STI), Univ Svizzera Italia, Lugano, SWITZERLAND, SEP 02-09, 2015.

STEM fields and their interactions



Science

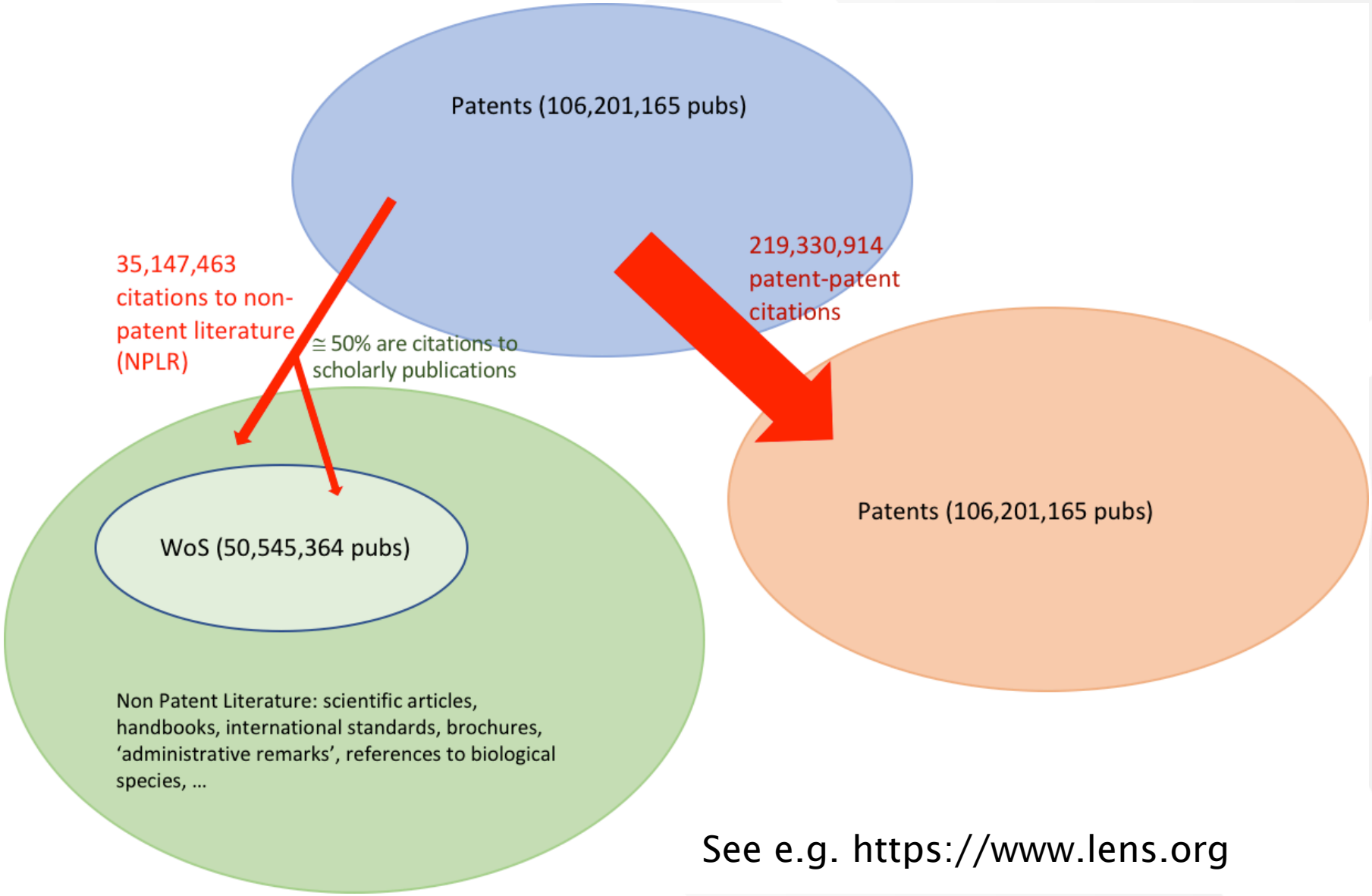
Science are the research publications cited in patents that **can** be identified in the PATSTAT database **and** covered in the CWTS-WoS database

Technology

All inventions for which a patent can be applied for

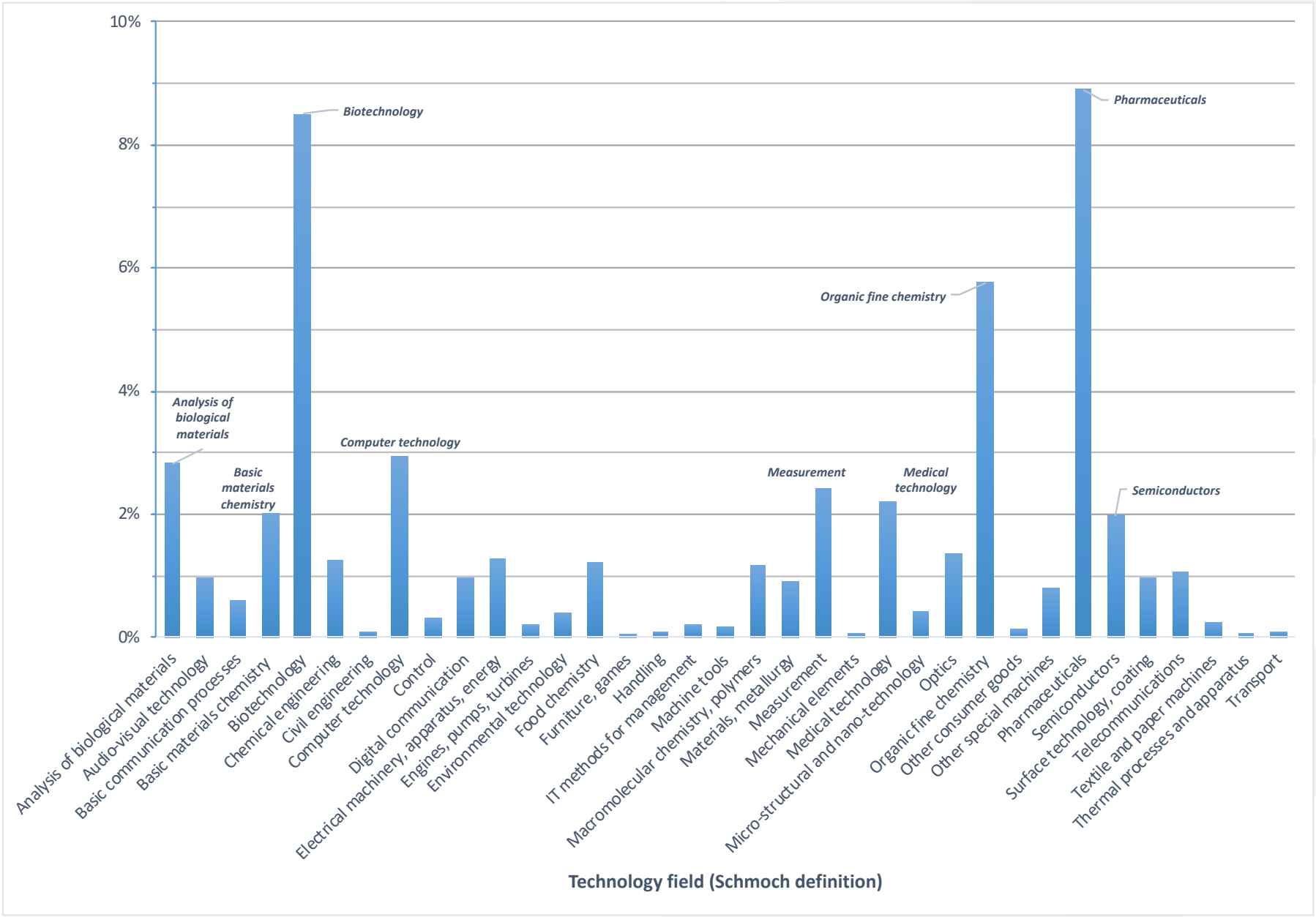
⟹ *An invention solves a technical/technological problem*

science and technology: two loosely connected spaces

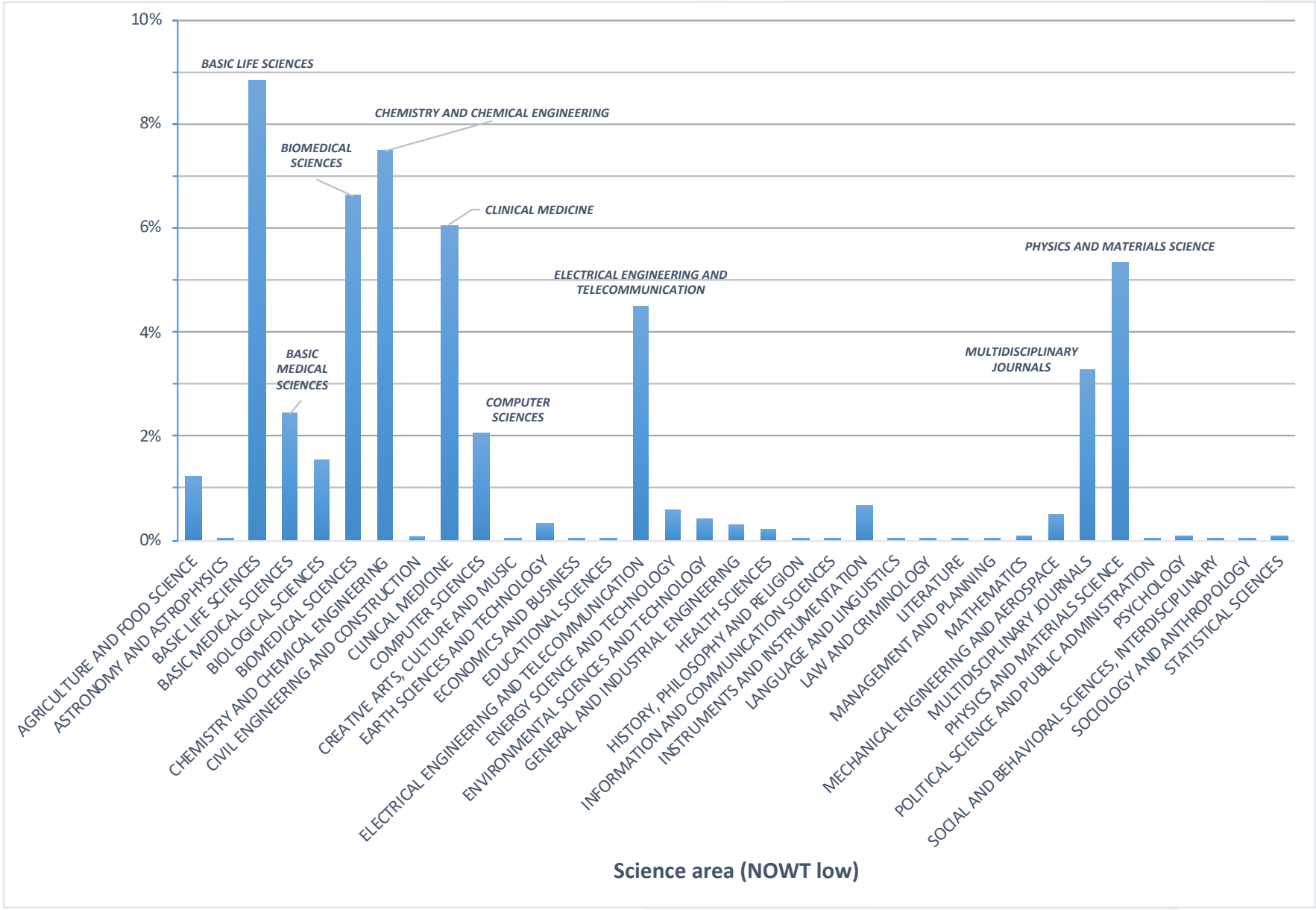


See e.g. https://www.lens.org

Technology fields (1980-2018)



Science areas (1980-2018)



Direct interaction of science and technology (1980-2018)

Research Orientation Focus

Journals are classified based on the distribution of the affiliations of the authors in:

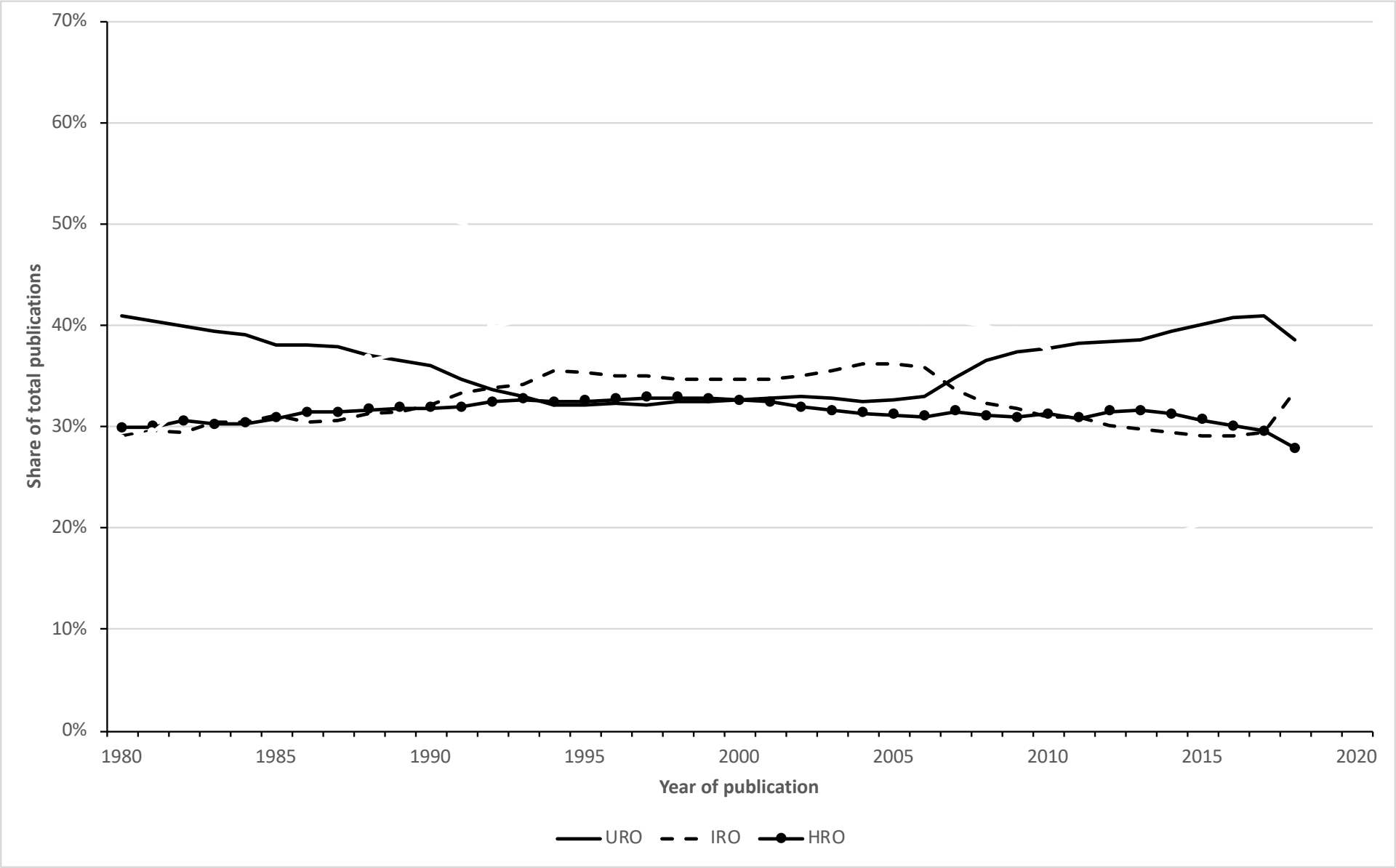
1. University Research Orientation (URO)
2. Industrial Research Orientation (IRO)
3. Health sciences/Hospital Research Orientation (HRO)

URO is considered to be ‘curiosity driven’ (‘fundamental’ or ‘basic’ research)

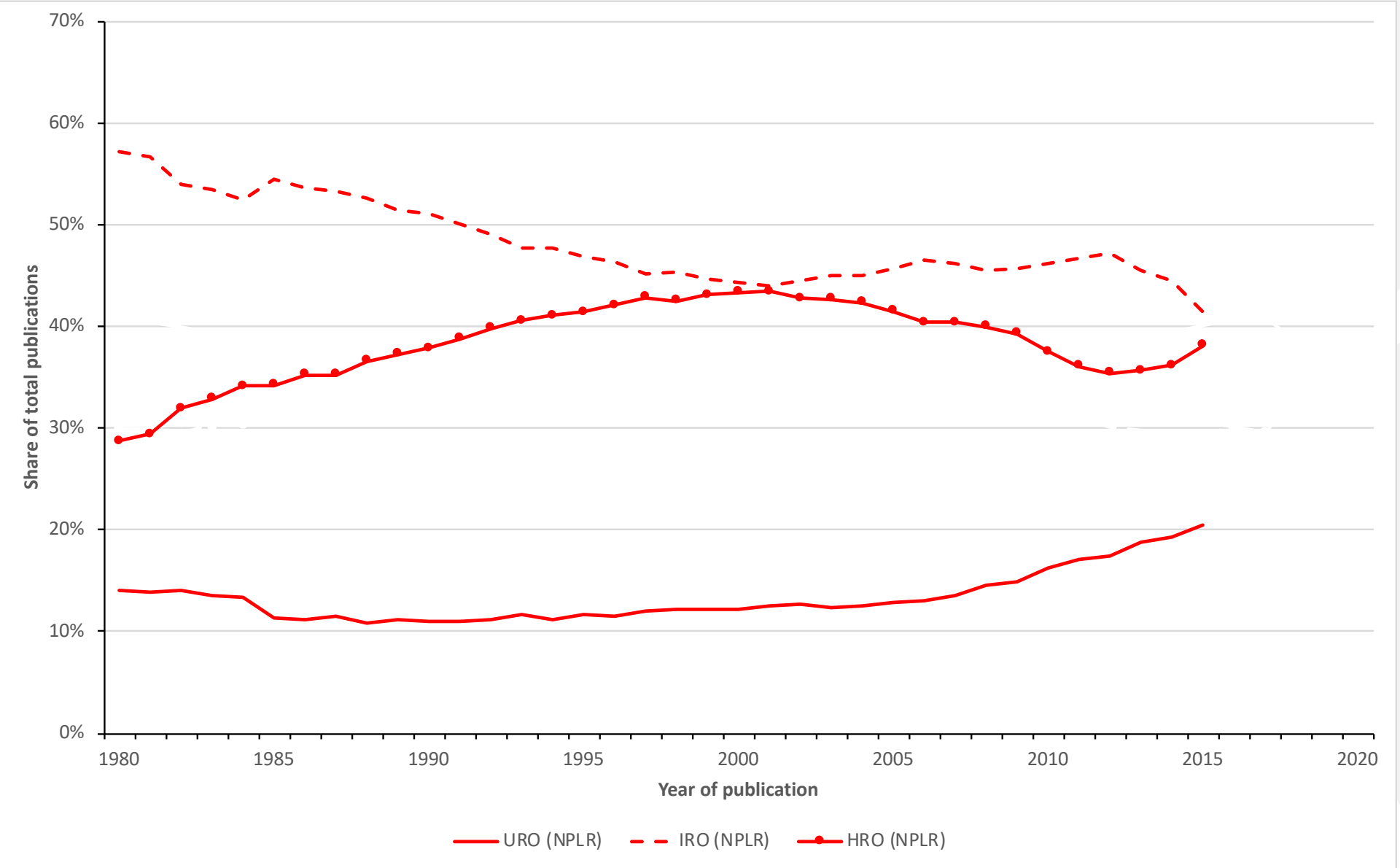
IRO and HRO are more oriented towards ‘application’

URO + IRO + HRO = 1

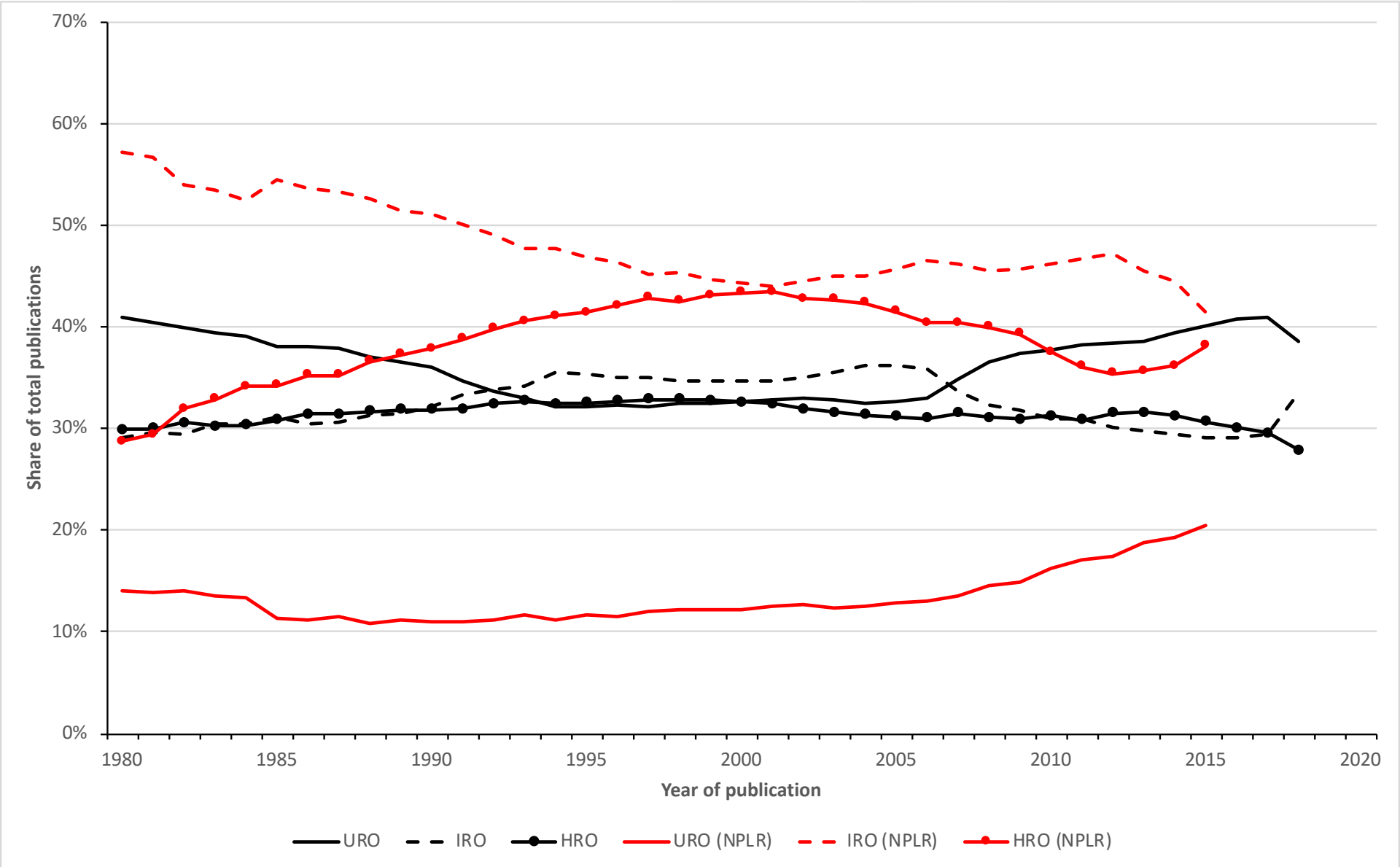
Evolution of URO, IRO and HRO (WoS)



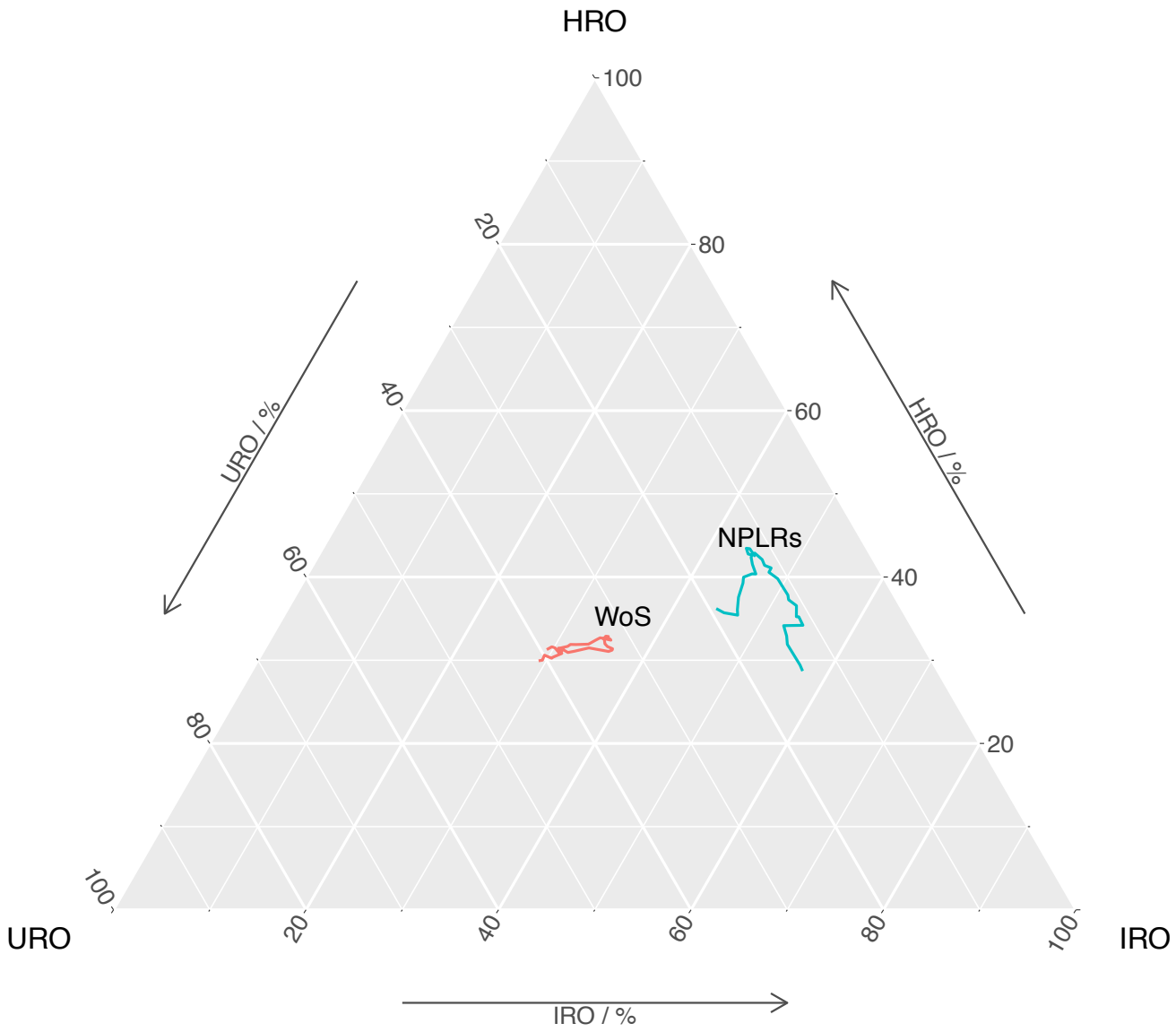
Evolution of URO, IRO and HRO (NPLRs)



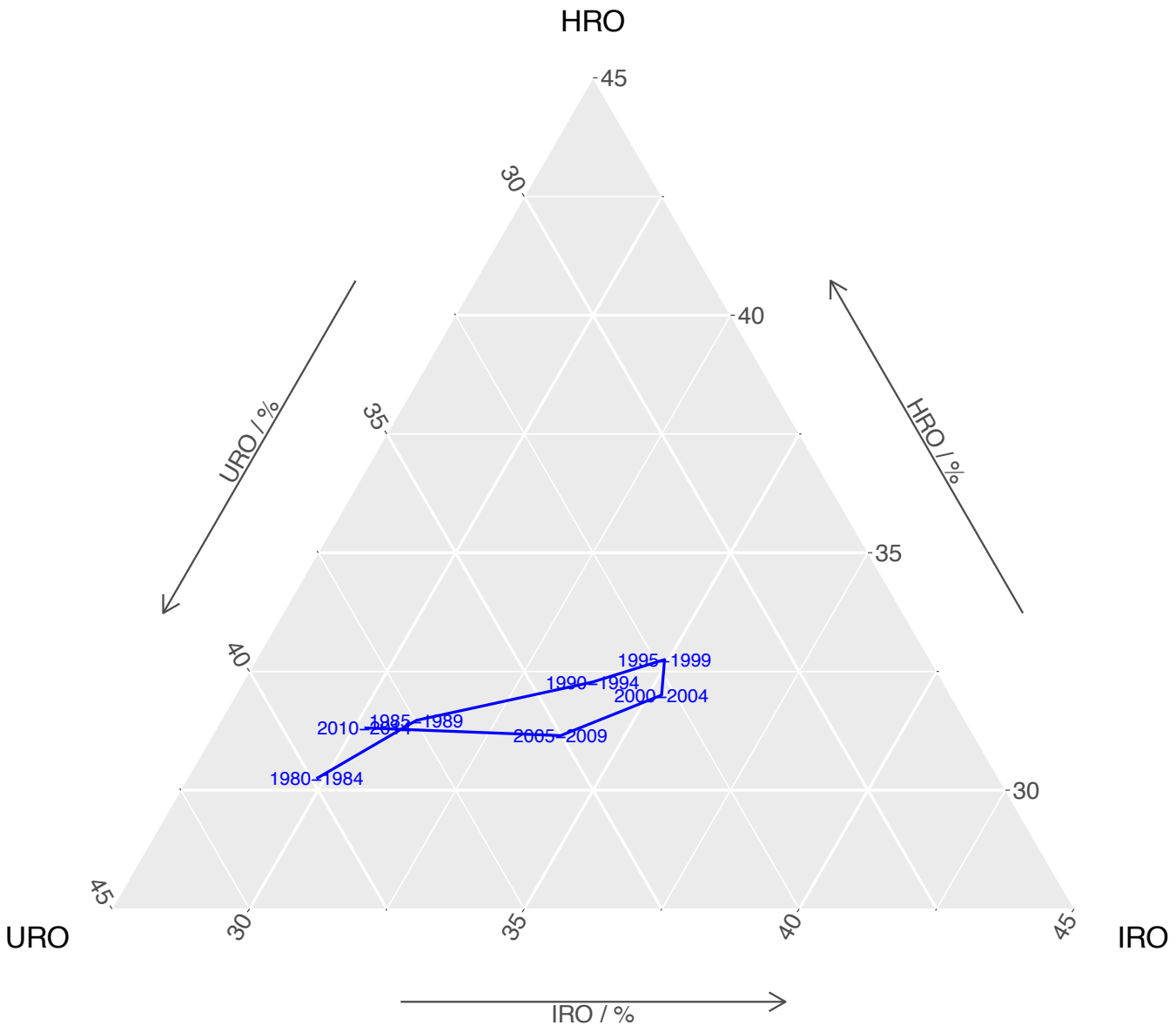
Evolution of URO, IRO and HRO (WoS & NPLRs)



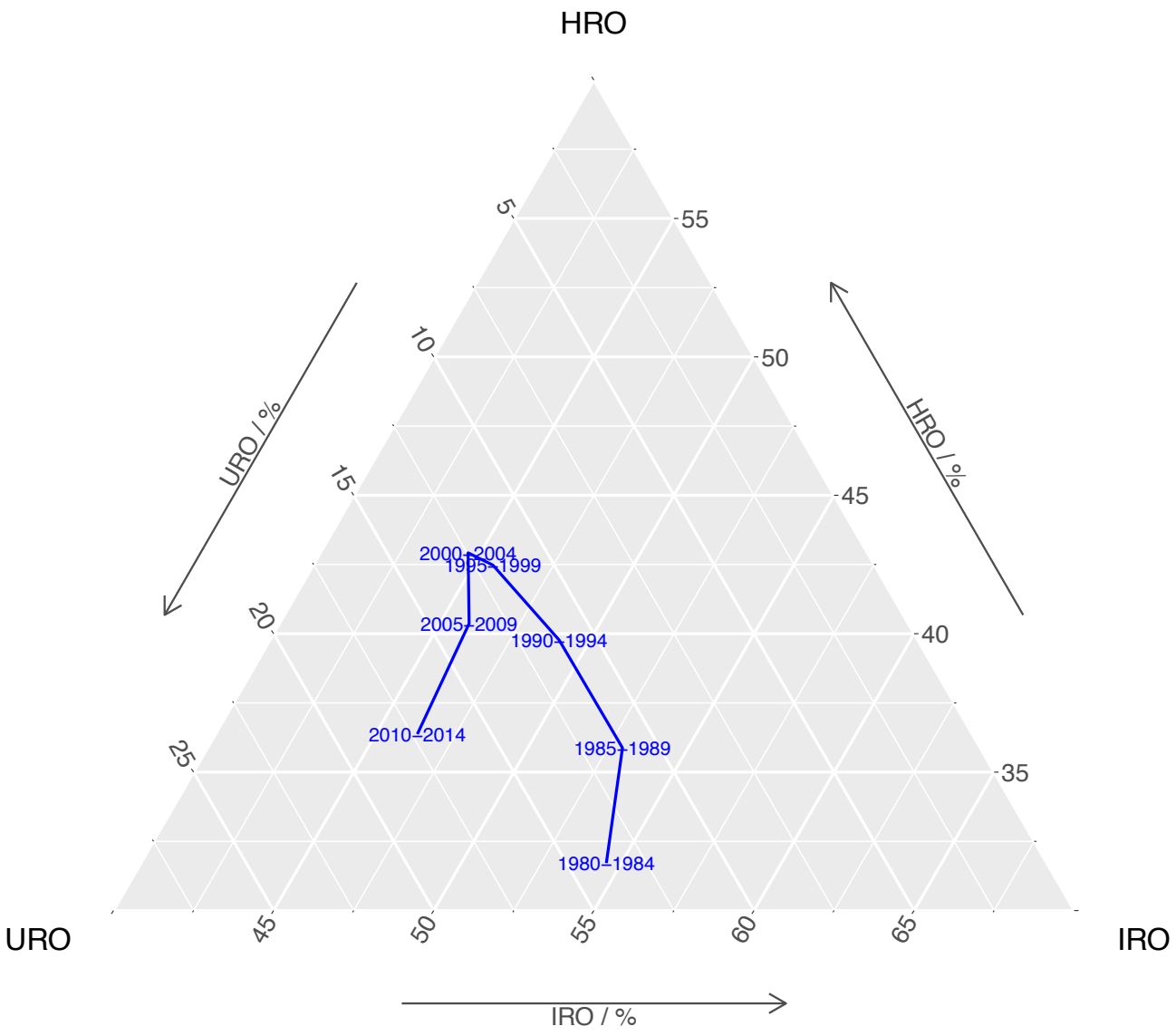
Research orientation based on WoS publications and NPLRs (1980–2014)



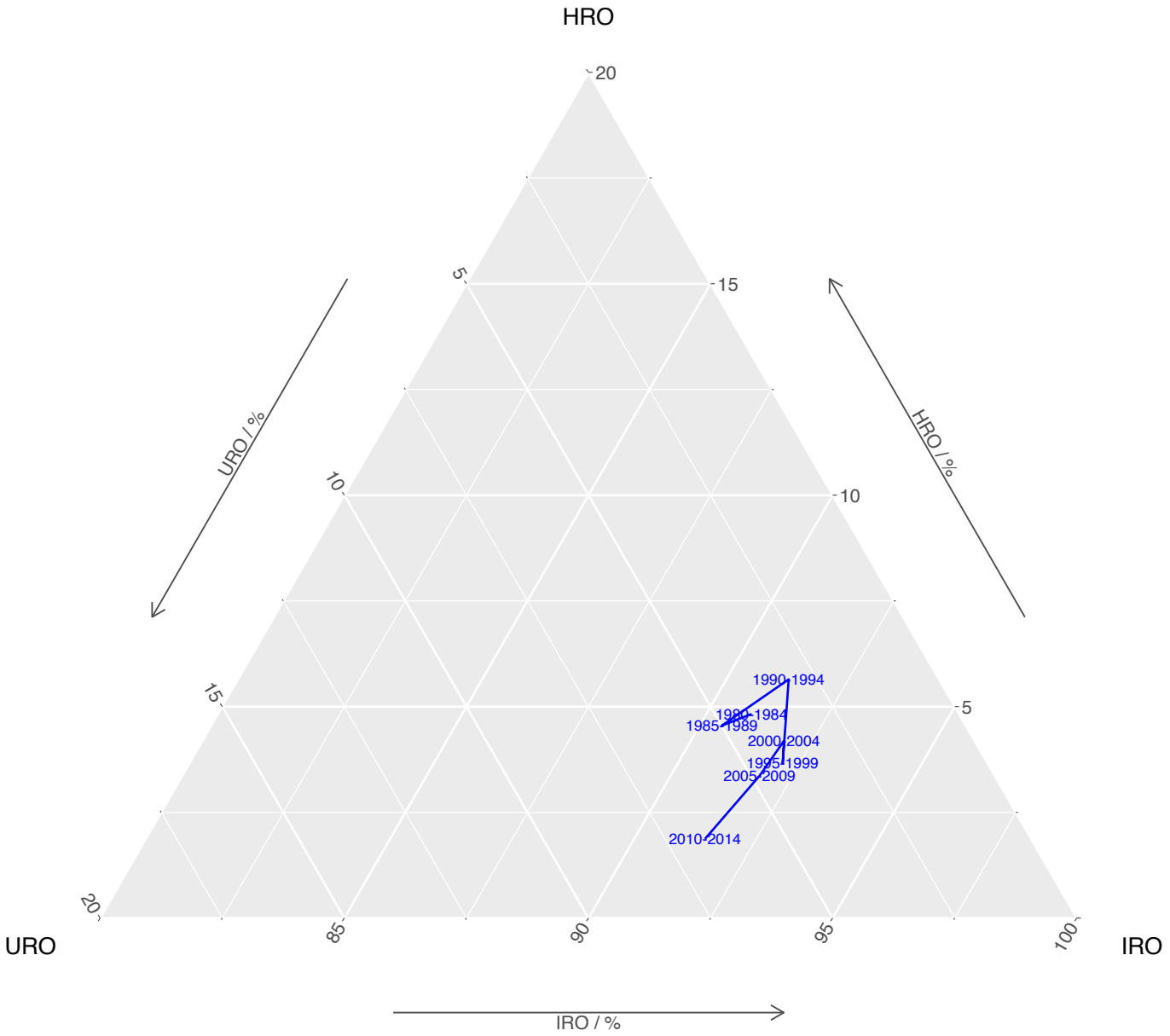
Research orientation based on WoS publications (1980–2014)



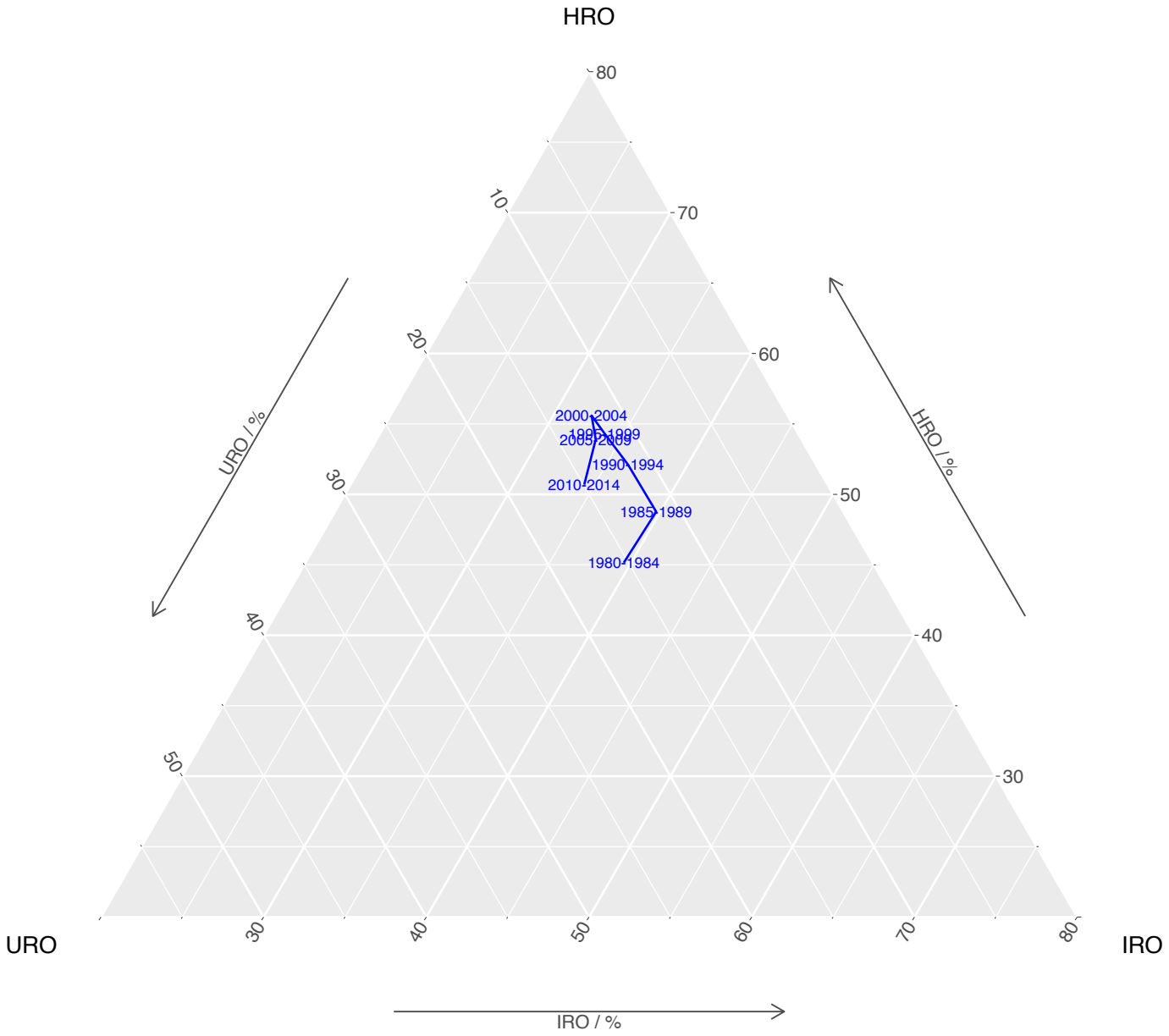
Research orientation based on WoS publications (1980–2014)
cited in patents



Research orientation of scientific publications suppporting Internet of Things (1980-2014)



Research orientation for scientific publications suppporting Biotechnology (1980-2014)



Concluding remarks

Science in general (WoS)

- URO, IRO and HRO are almost in balance
- More industrial oriented until 2000
- Became more university oriented since 2000

Science supporting technology (NPLRs)

- more ‘applied’ (IRO higher)
- Significant drop in HRO from 2000 onwards
- become more URO-oriented (discovery science)