

Data-intensive approaches to finding and predicting research outcomes for New Zealand health research

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Digital Science
eResearchNZ 2020

Agenda

- Introduction
- Case study: “New Zealand Health Research Strategy: 2017-2027”
- Has NZ achieved strategic priorities?
- Where does quantitative data succeed/fail?
- Conclusion



Image captured via: twi.org

Introduction

Report accessed via: health.govt.nz





Stephanie Guichard



Stacy Konkiel

Disclaimers!

Case study: “New Zealand Health Research Strategy: 2017-2027”

Purpose: “The Government's vision is for New Zealand to have a world-leading health research and innovation system that is founded on excellent research and improves the health and wellbeing of all New Zealanders. A set of guiding principles, strategic priorities and immediate actions will help to achieve this vision by 2027.”



Case study: “New Zealand Health Research Strategy: 2017-2027”

A fantastic national-level document that:

- Clearly articulates strategy
- Incorporates equity at its core
- Describes specific metrics by which progress should be measured



Case study: “New Zealand Health Research Strategy: 2017-2027”

Performance indicators include:

- Amount & kinds of research
- Investment in research
- Collaborations (authors, funders, regionality)
- Commercialization
- Research to improve the lives of Māori, Pacific, and disabled peoples



<https://www.health.govt.nz/publication/new-zealand-health-research-strategy-2017-2027>

Our Goals

- Understand NZ research with desired outcomes
- Predict future trends
- Suggest ways to achieve desired outcomes

About altmetrics & Altmetric

Altmetrics: Indicators that help us understand the online engagement with research.

Altmetric: A company that collects this information and offers products to track engagement with research.



About bibliometrics & Dimensions

Bibliometrics are indicators that help us understand the relationships between documents, their authors, journals, disciplines, etc.

Dimensions is an interlinked research intelligence database created by Digital Science.



About data science approaches

- Exploratory visualization
- Regression analysis for forecasting
- Cluster analysis

Case study: “New Zealand Health Research Strategy: 2017-2027”

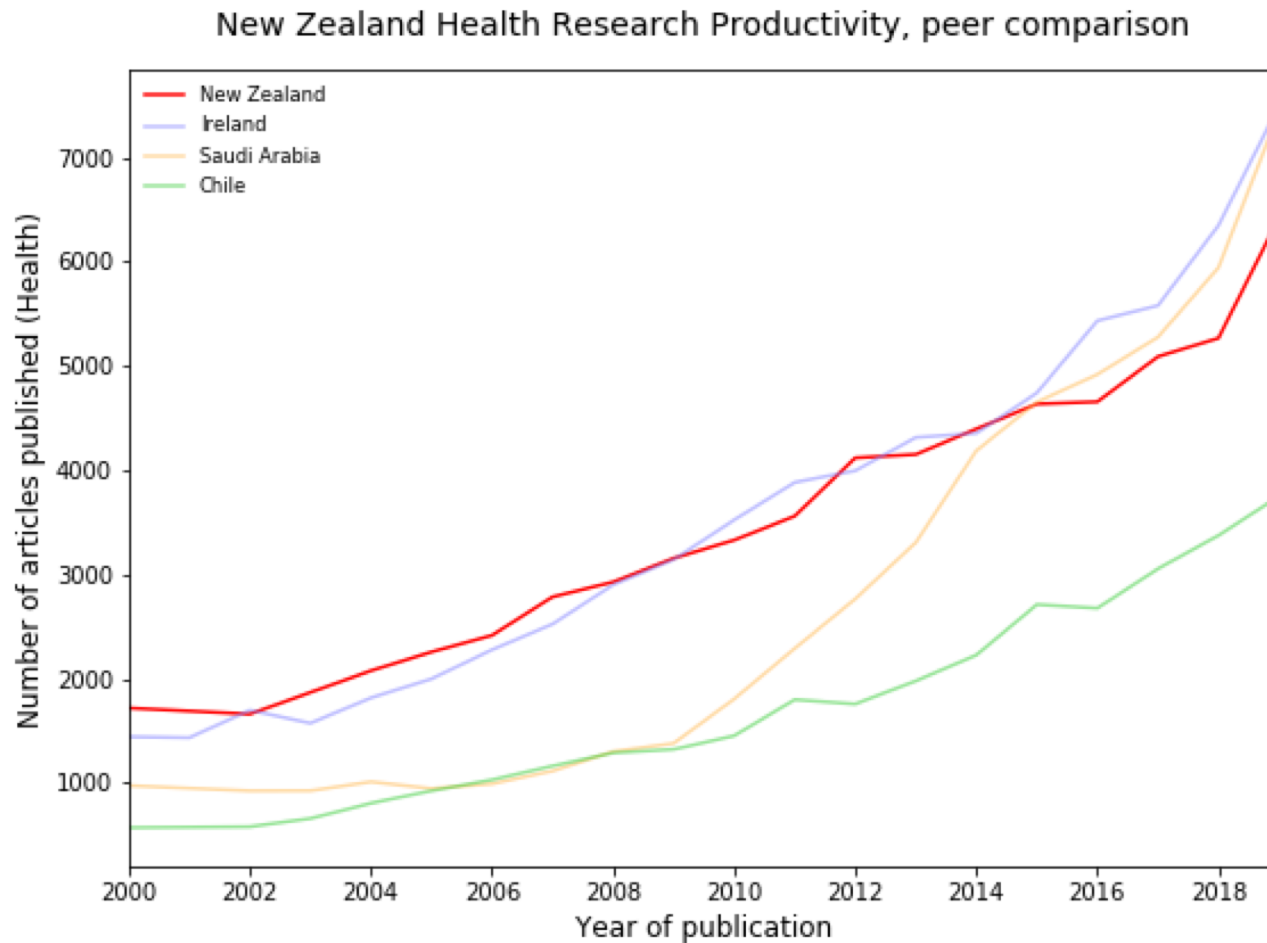
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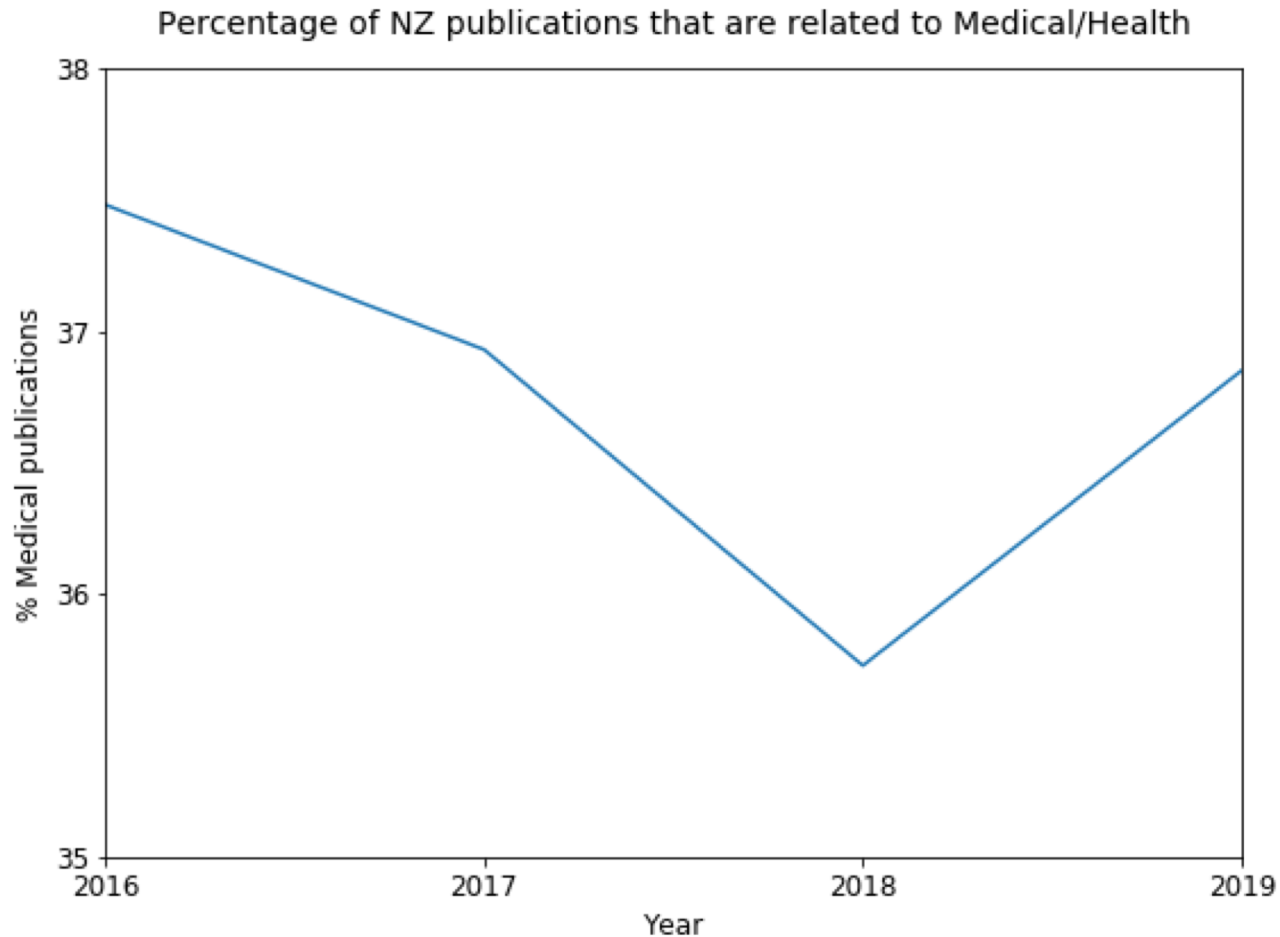
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Amount of health research



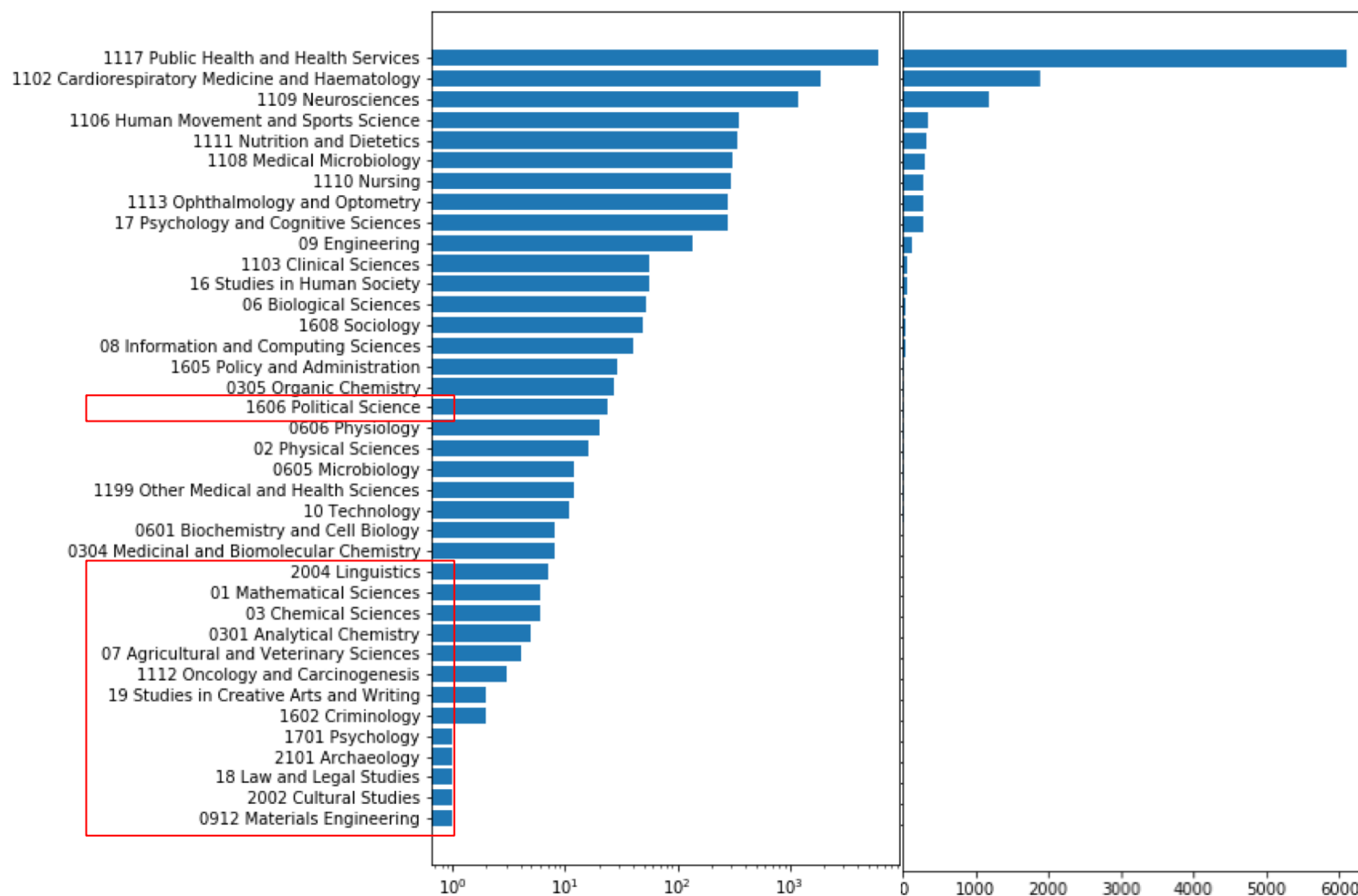
Exploratory visualization

Amount of health research



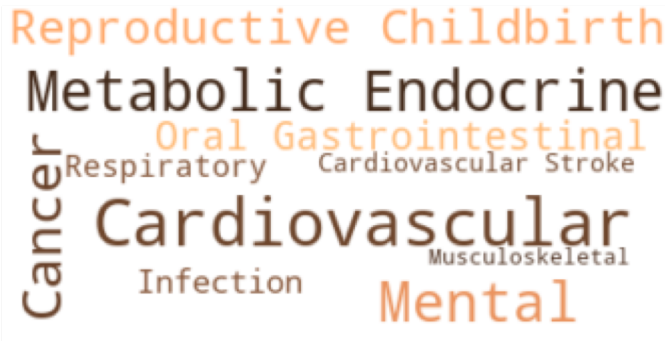
Exploratory visualization

Research topics: FOR

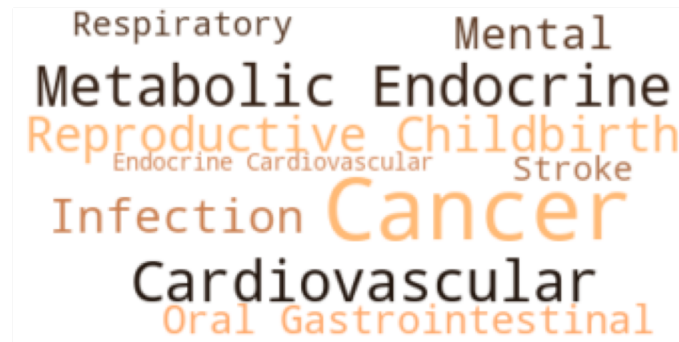


Exploratory visualization

Research topics: HRCS



Māori



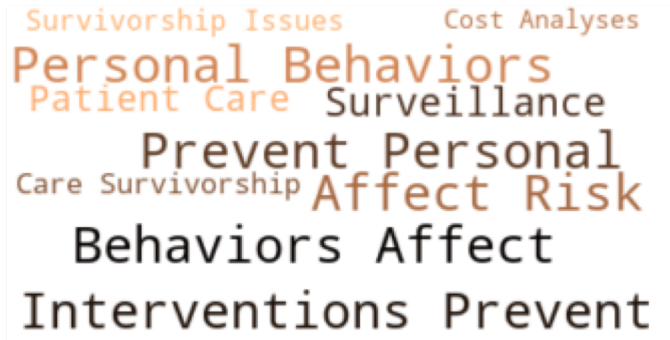
Pacific



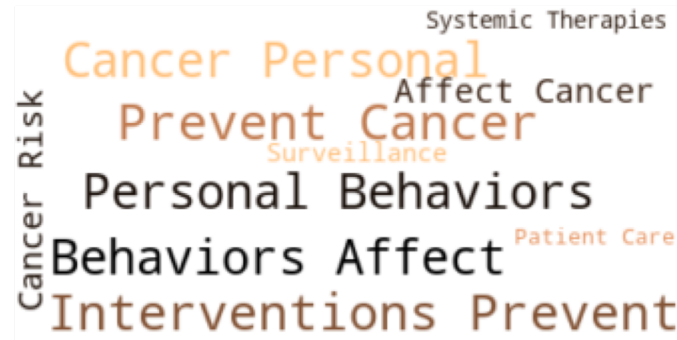
Disability

Exploratory visualization

Research topics: ICRP CSO



Māori



Pacific



Disability

Exploratory visualization

Case study: “New Zealand Health Research Strategy: 2017-2027”

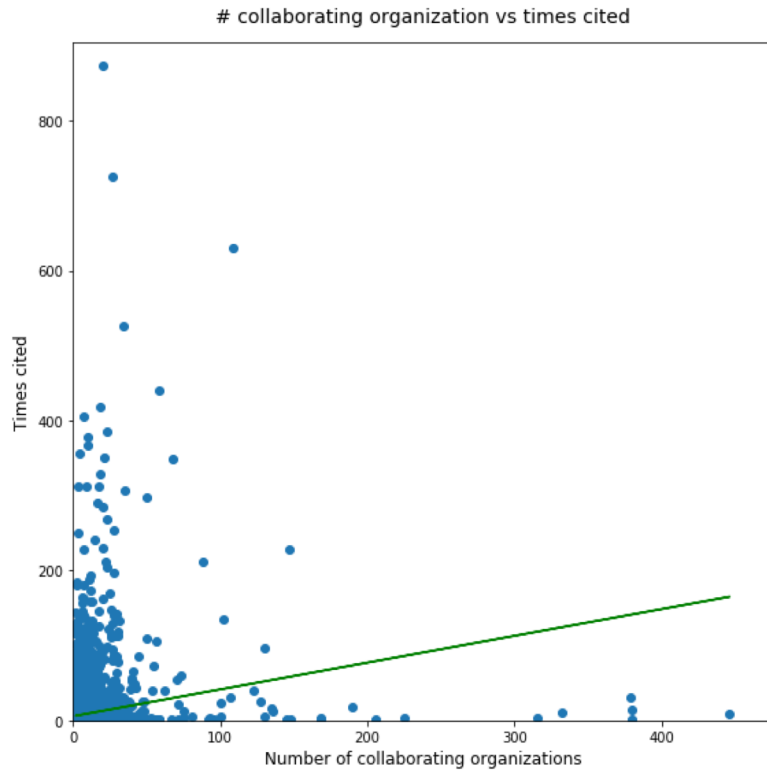
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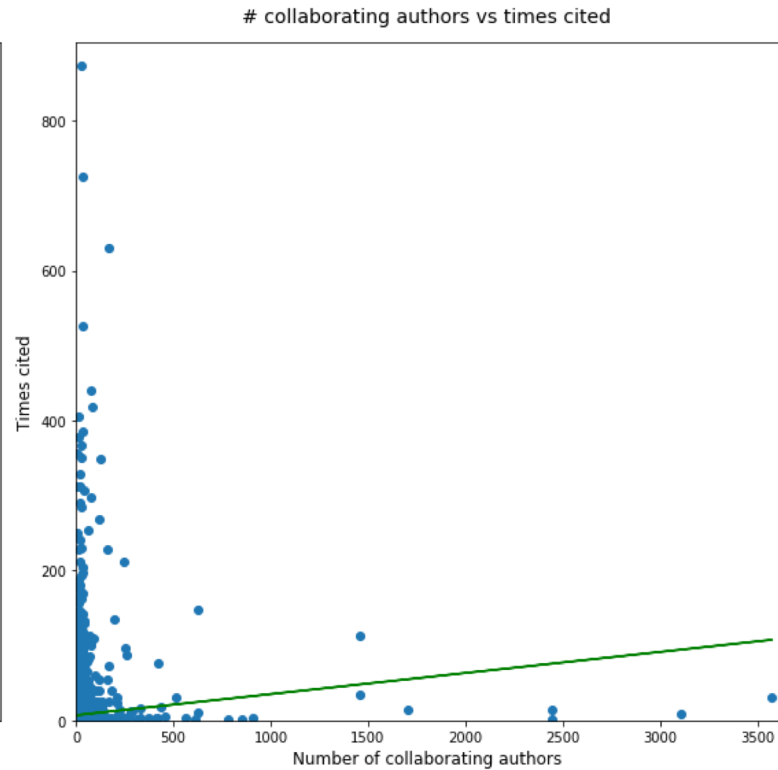


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Collaborators & citations



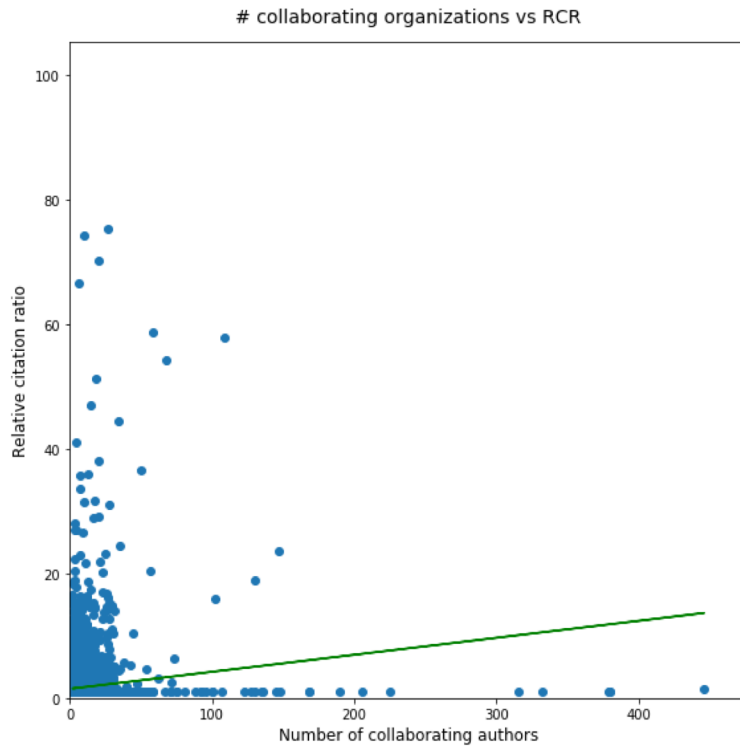
$$r^2 = 0.169$$



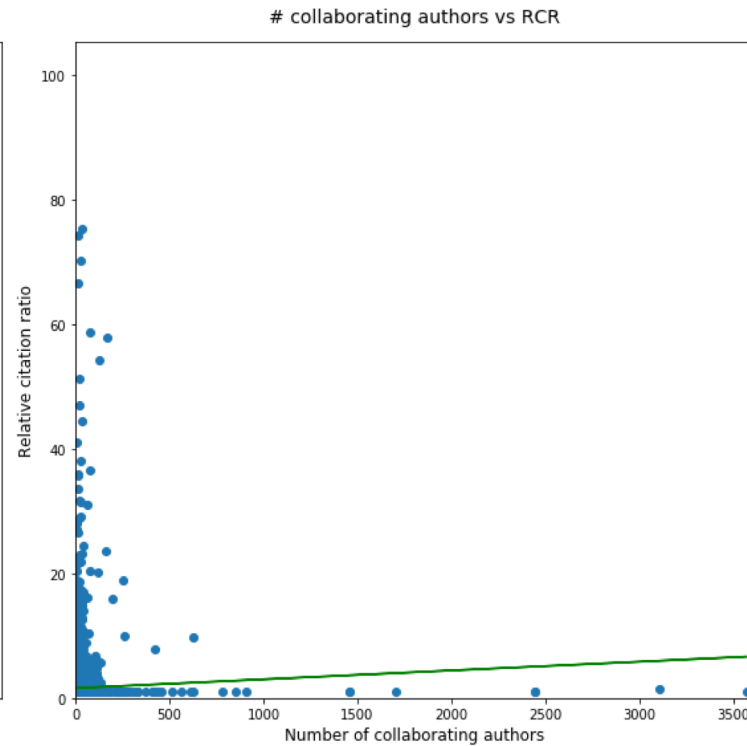
$$r^2 = 0.073$$

Regression analysis

Collaborators & RCR



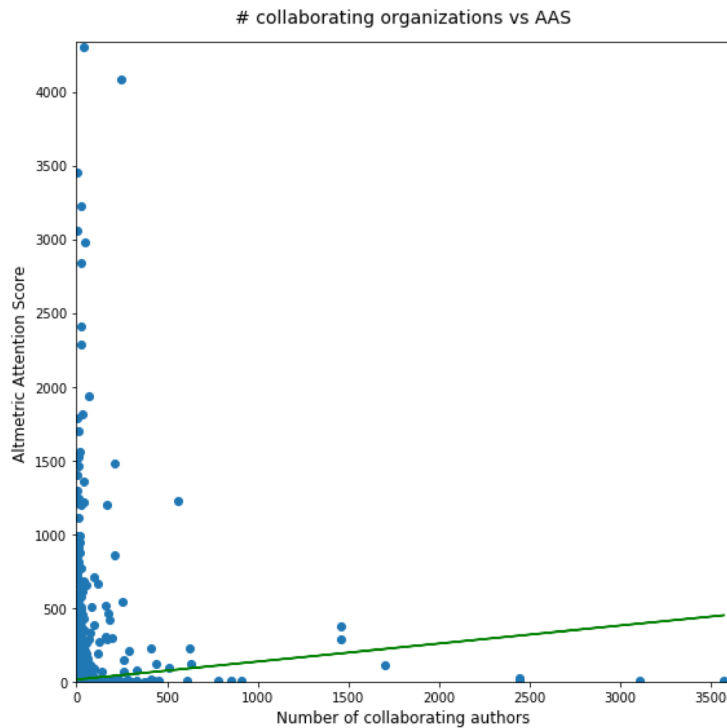
$$r^2 = 0.116$$



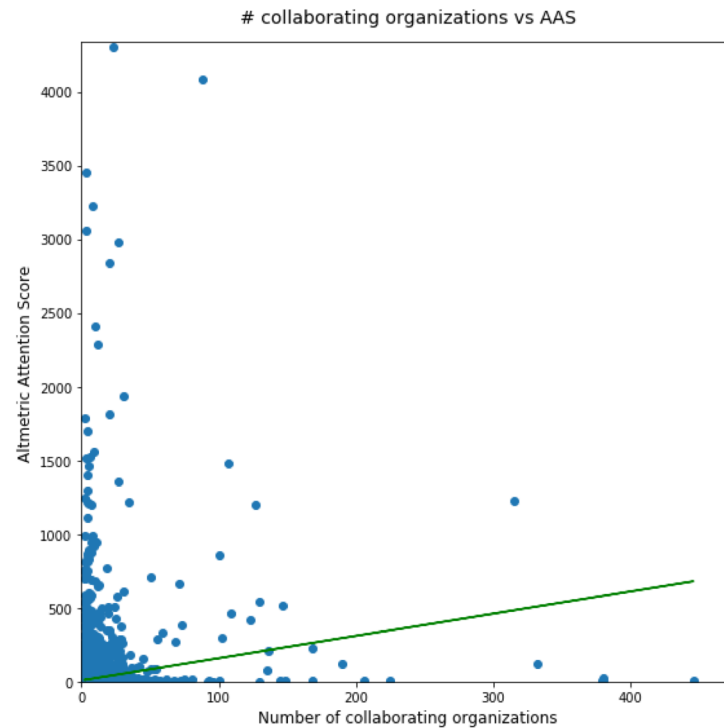
$$r^2 = 0.033$$

Regression analysis

Collaborators & altmetrics



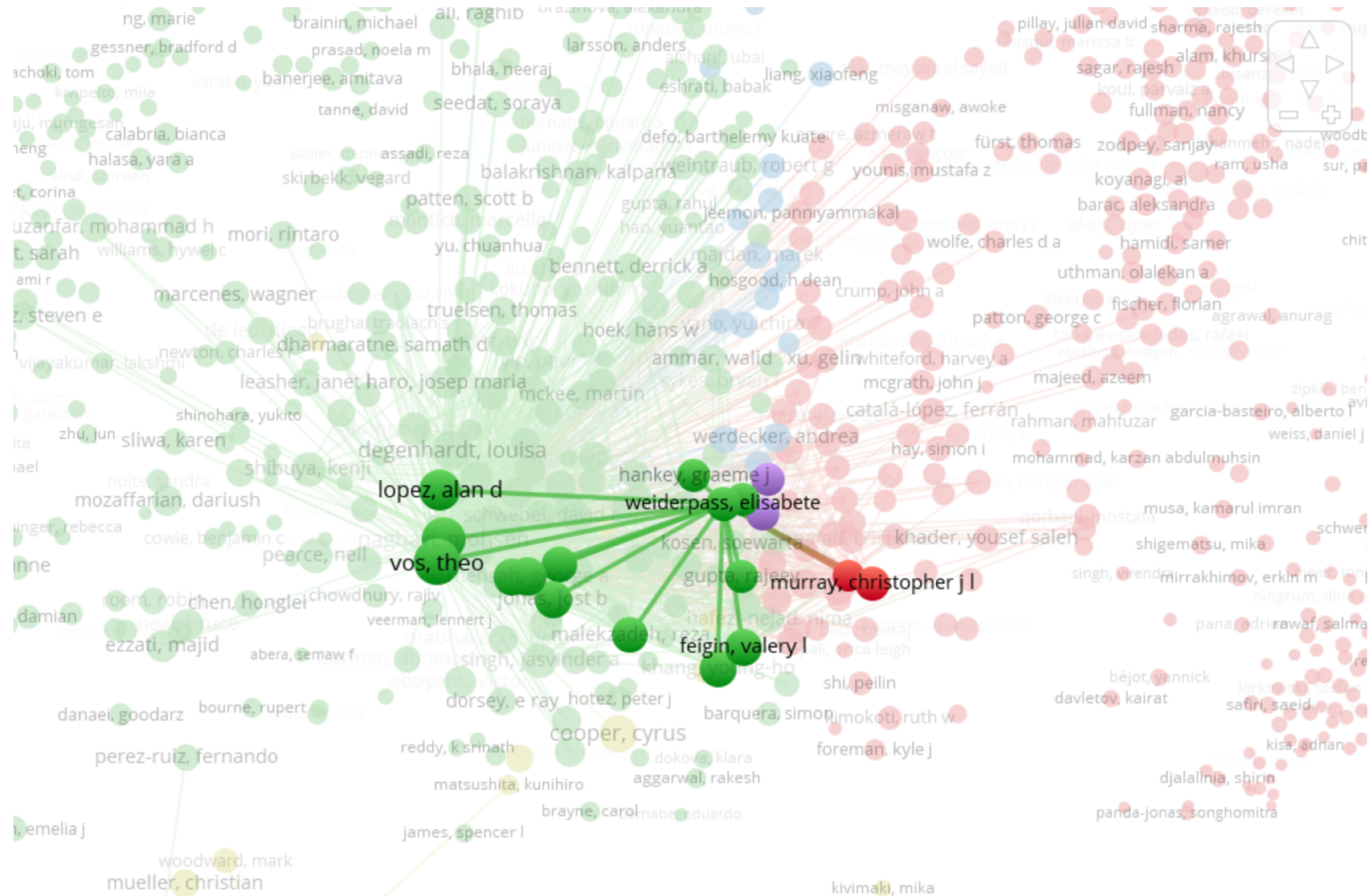
$$r^2 = 0.145$$



$$r^2 = 0.064$$

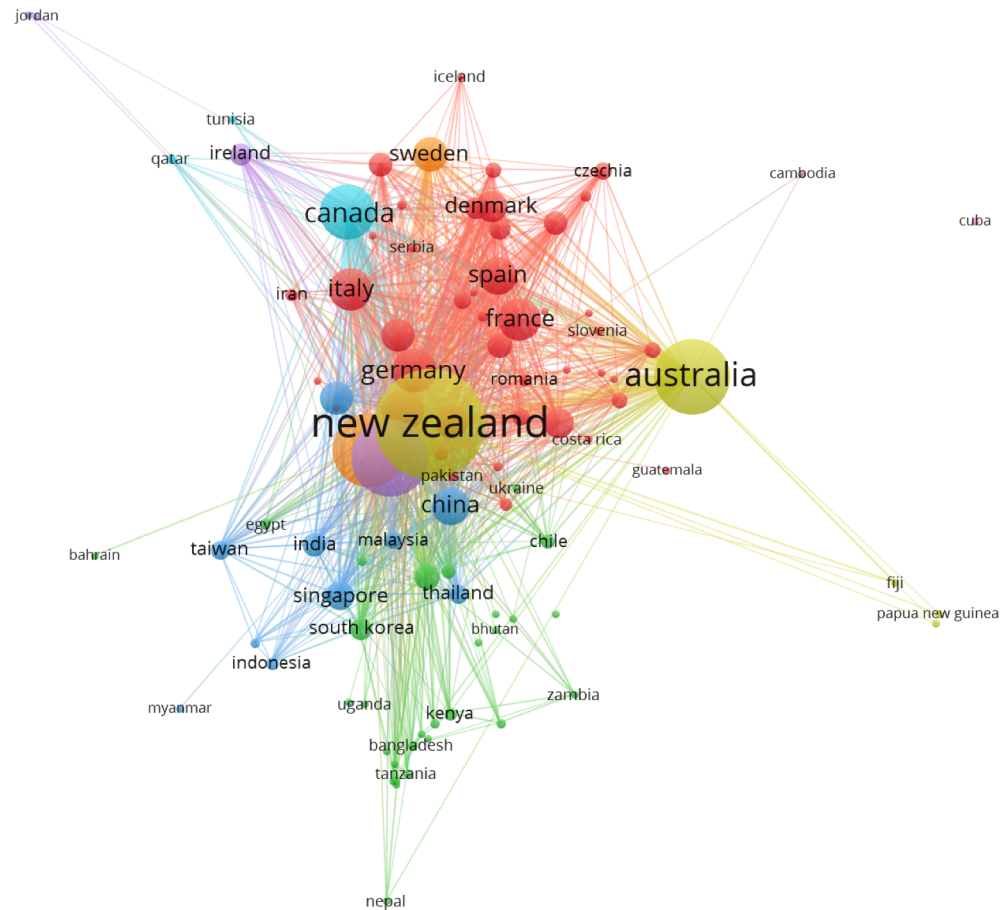
Regression analysis

Collaboration



Cluster analysis

Collaboration - international



Cluster analysis

Case study: “New Zealand Health Research Strategy: 2017-2027”

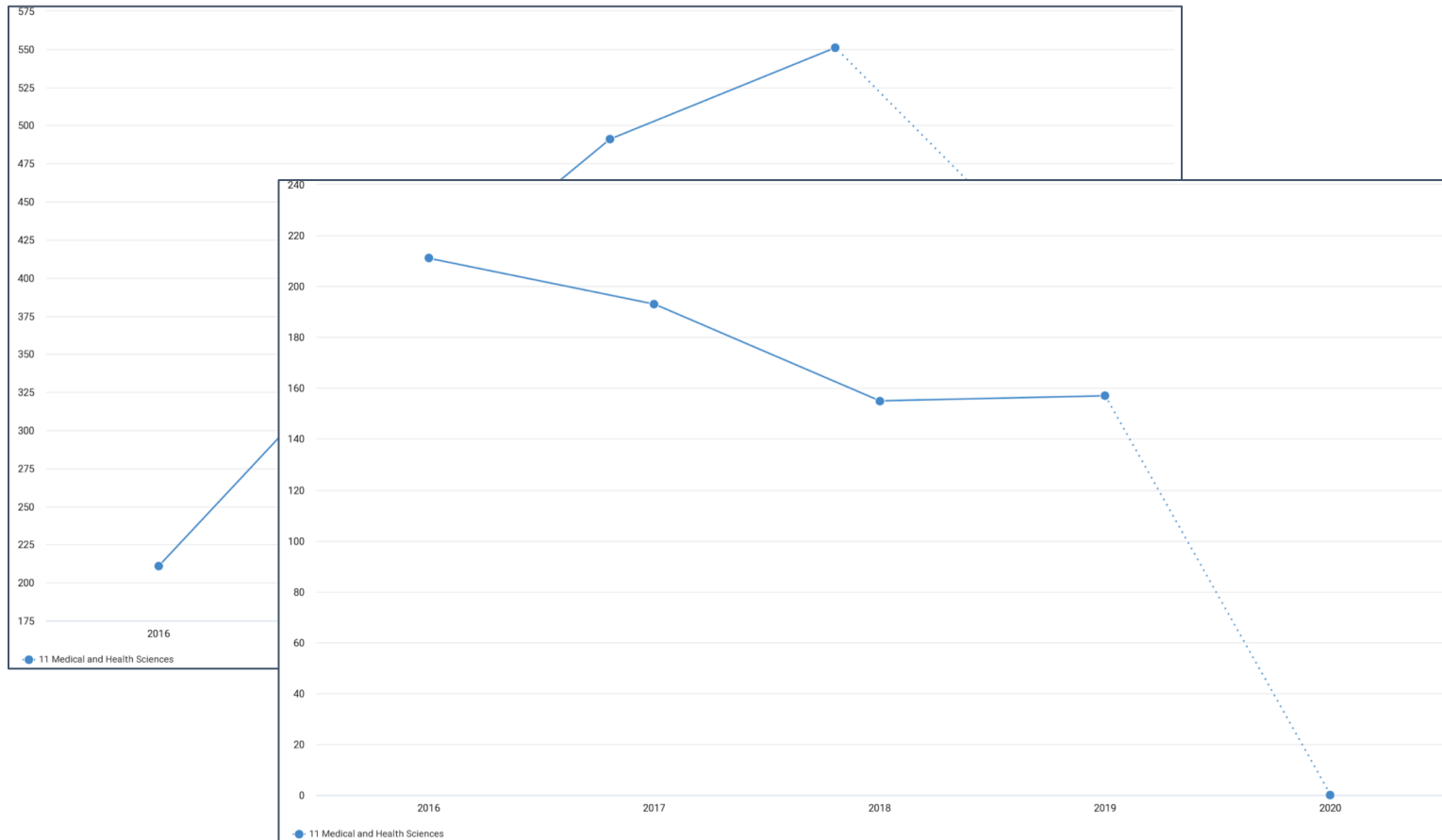
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- Commercialization
- Research to improve the lives of Māori, Pacific, and disabled peoples



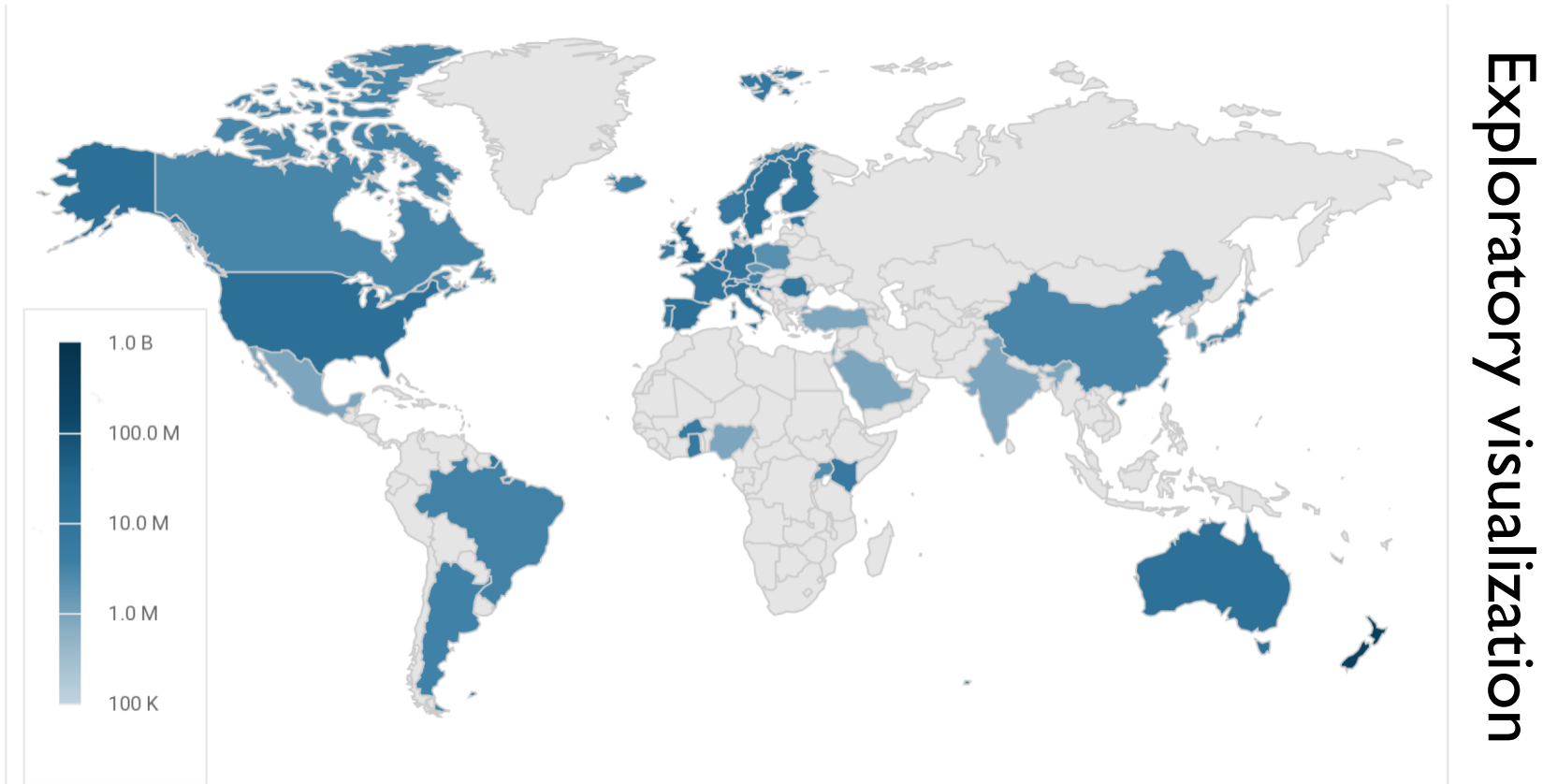
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Investment in research

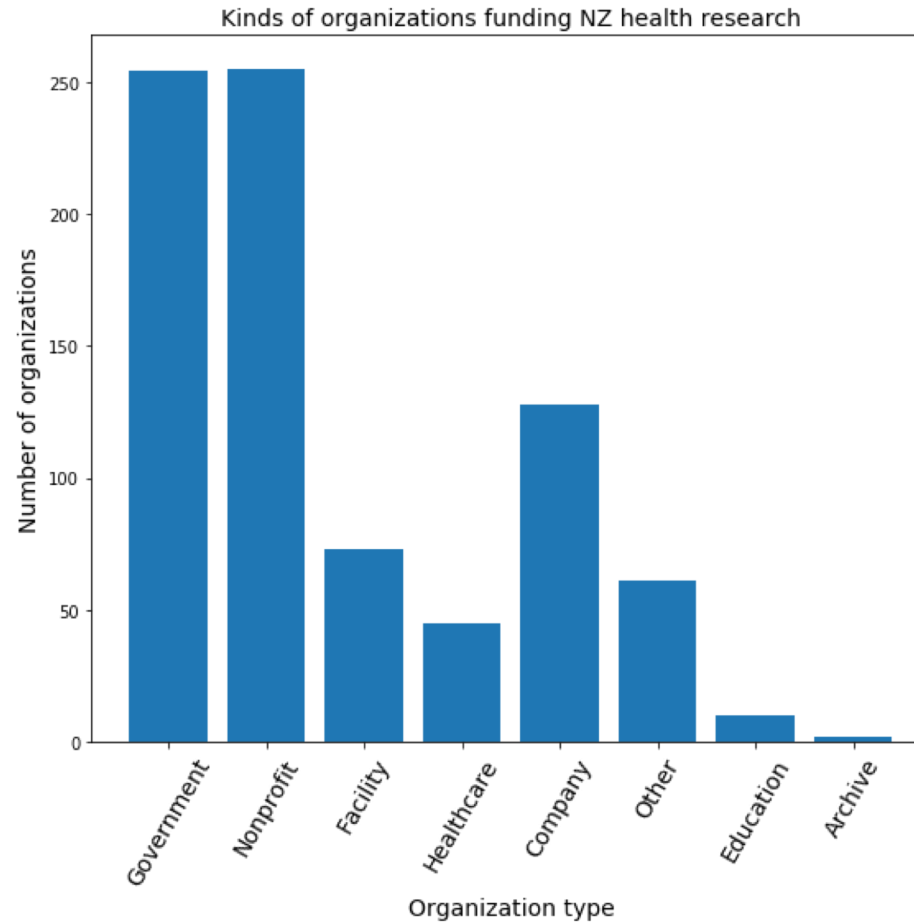


Exploratory visualization

International investment



Non-profit investment



Exploratory visualization

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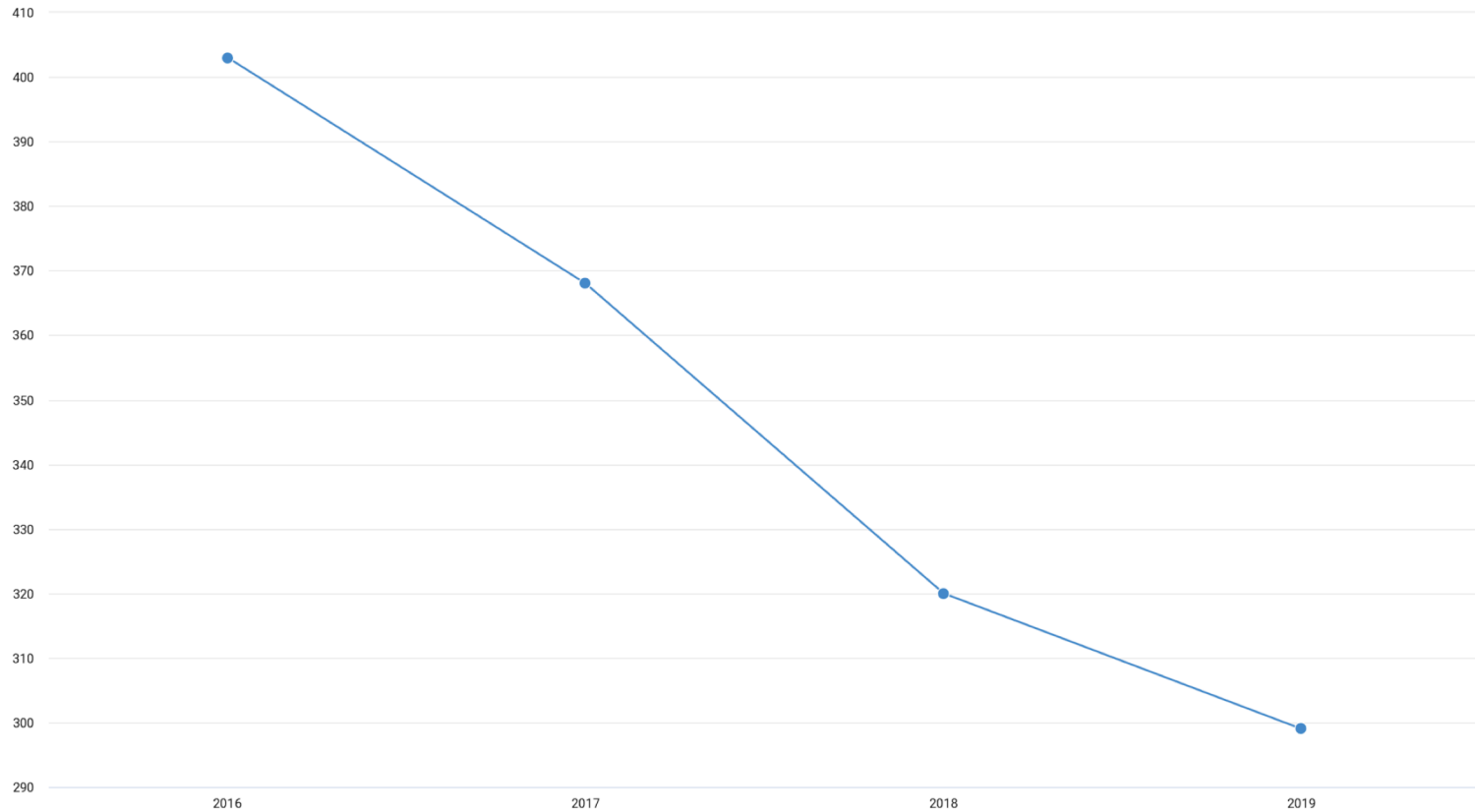
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Commercialization: Patents



Exploratory visualization

Commercialization: Clinical trials

Exploratory visualization



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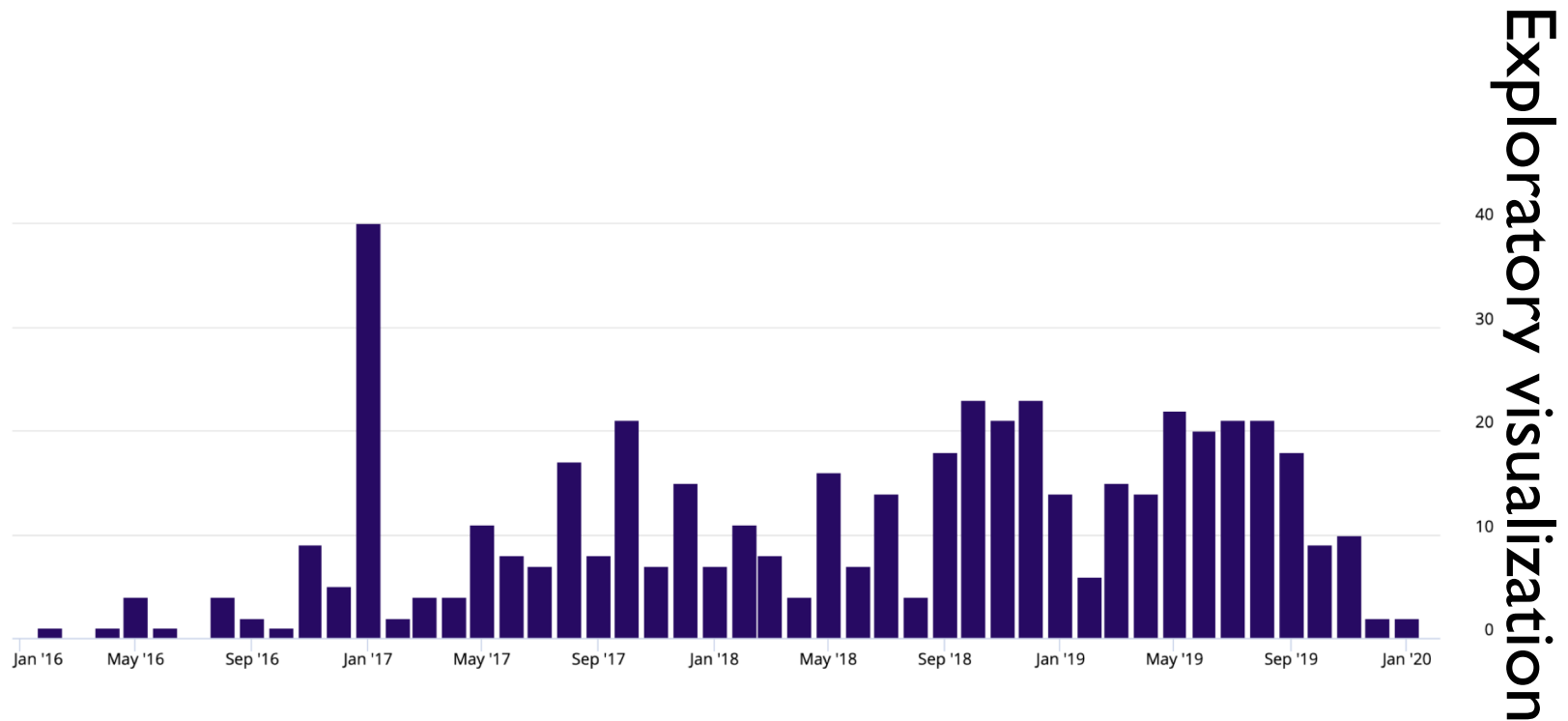
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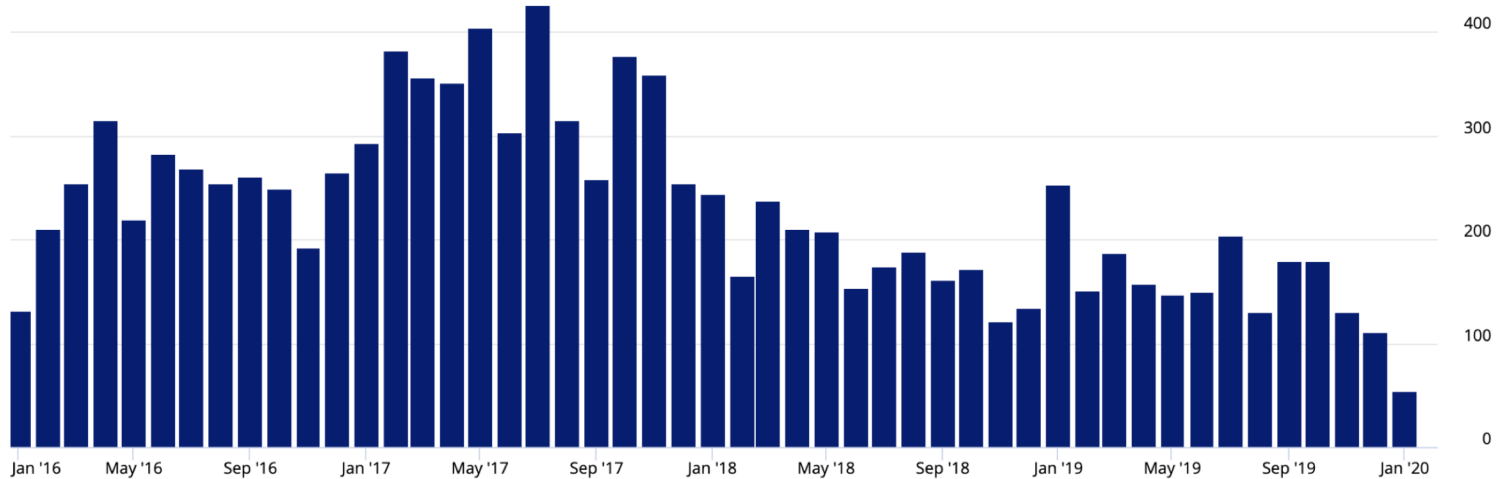


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Improving lives (policy)



Improving lives (Facebook)



Exploratory visualization

Where does the data succeed vs fail?

Data (science) is useful for...

- Finding high-level trends:
 - Collaborations (individuals, countries, etc)
 - Subject areas
 - Productivity
 - Research investment
- Identifying superconnectors
- Finding areas of strength and weakness

Data (science) is not useful for...

- Predicting future impact trends* (*more research needed*)
- Understanding cultural contexts, nuance
- Automating evaluation
 - System specificities and algorithms can be biased
 - Need human intervention to interpret the data, given caveats

Conclusion

Conclusion

Measurement of progress towards goals enabled by:

- Thoughtful strategic planning and programme evaluation
- Linked, rich data (and lots of it)
- Programmatic access to data at scale
- Careful use of the right data science approaches

Conclusion

Try this yourself!

- Dimensions
- Altmetric
- Web of Science
- Scopus
- Plum Analytics
- Incites
- Pubmed
- Datacite
- Crossref
- Scival
- IFI Claims
- Google Patent Search
- Derwent
- ClinicalTrials.gov
- Overton.io

Thanks

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