Under the Sun:
The Importance of Case Study Documentation and Publication to the Future of Industrial Statistics

Allison Jones-Farmer

September 24, 2019

**What has been will be again,
what has been done will be done again;
there is nothing new under the sun.**

Ecclesiastes 1:9

We learn from each other, sort of…

"…smart statisticians and engineers have been solving large, complex, unstructured problems for a long time, people such as Fisher, Gosset, Box, Tukey, and so on. <u>What has been missing, however, is documentation</u> of exactly how these brilliant people actually approached their problems and found solutions."

Jones-Farmer and Hoerl, 2019

Informal Poll

We learn from each other, sort of…

**Toward a Theory of
Knowledge Reuse:
Types of Knowledge Reuse
Situations and Factors in
Reuse Success**

M. LYNNE MARKUS

ONE OF THE KEY THEMES IN KNOWLEDGE MANAGEMENT today is the role of information technology (IT) in the transfer of knowledge between those who have it and those who don't. It is widely acknowledged that knowledge has two dimensions—*explicit* (knowledge that has at minimum been "captured" and articulated and has ideally been "codified," that is, documented, structured and disseminated) and *tacit* (knowledge that resides in people's heads or "muscle memory" and may be destined to remain there). Only explicit knowledge is the province of information technology,

Google Scholar

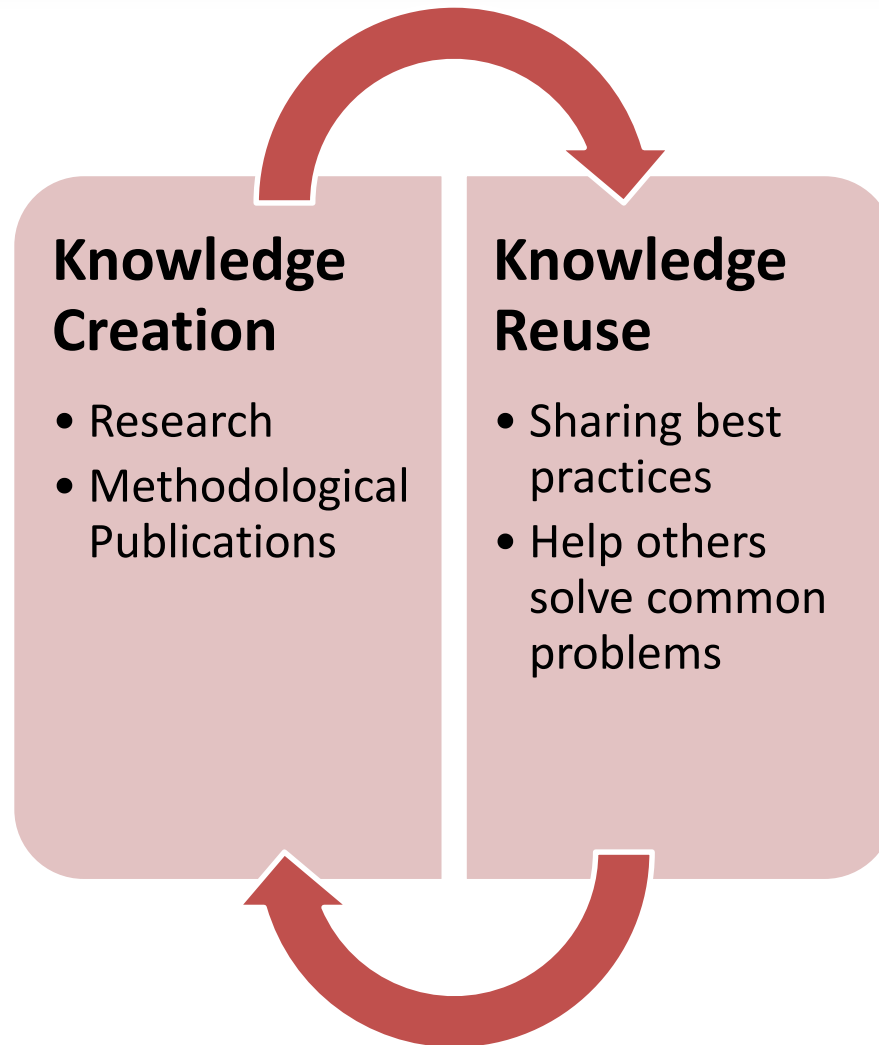☆ 🔖 Cited by 1357

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We learn from each other, sort of…

An important aspect of our jobs as scientists, statisticians, and engineers is to **explicitly document** our findings, and **disseminate** this knowledge.
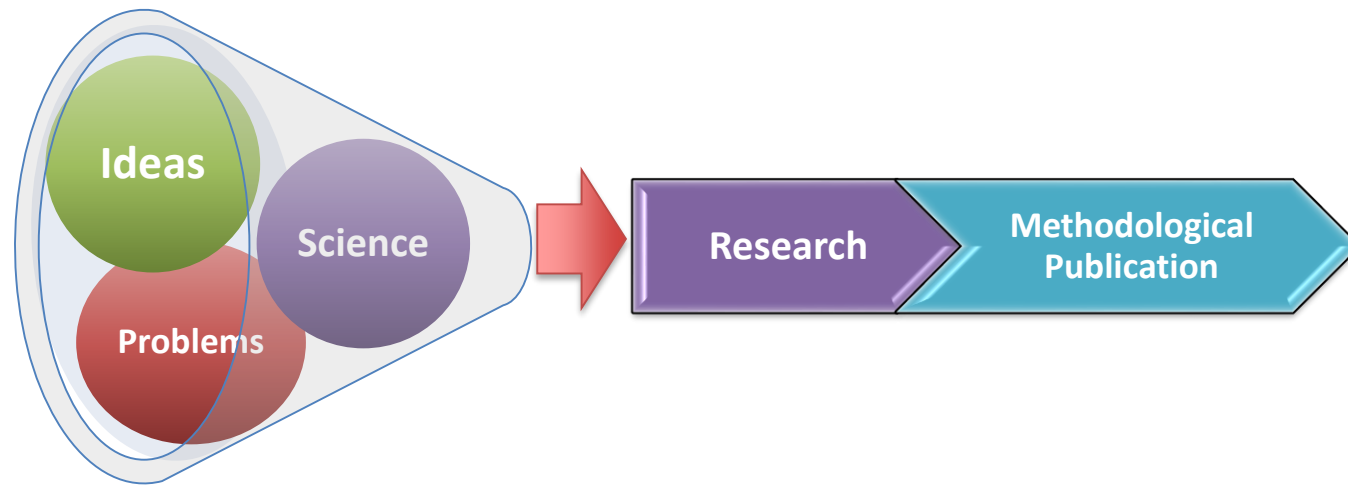
Tacit knowledge that resides only in our heads **is of little use** in helping others solve large, complex, unstructured problems.

We learn from each other, sort of…

Knowledge Creation

- Research
- Methodological Publications

Knowledge Reuse

- Sharing best practices
- Help others solve common problems

What is our end-goal of Knowledge Creation?

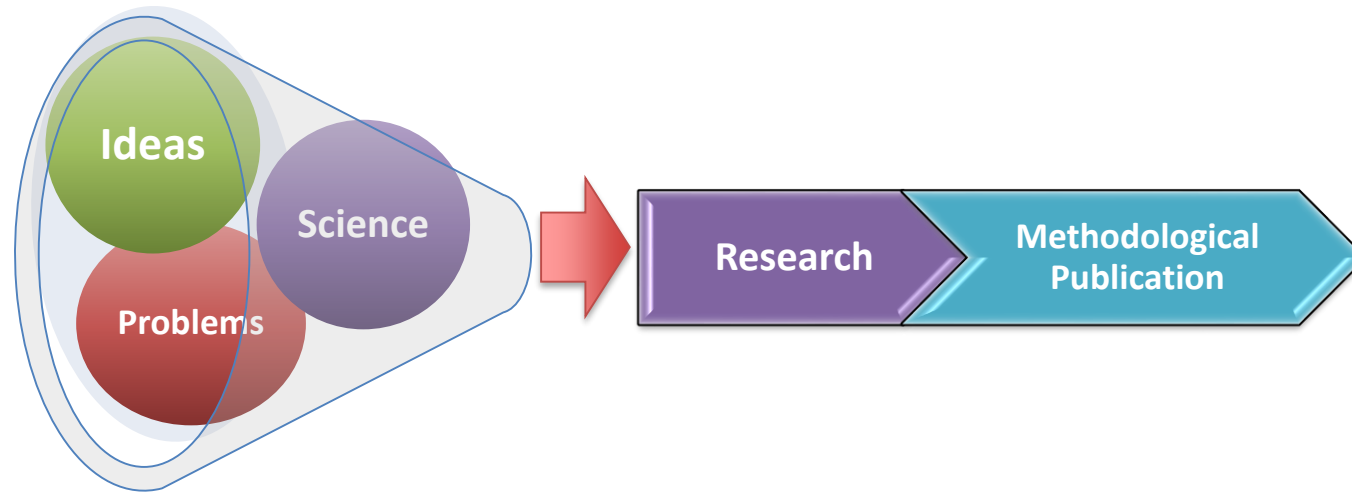Ideas, Science, Problems → Research → Methodological Publication → ?

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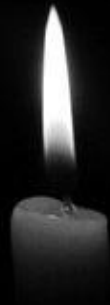
What is our end-goal of Knowledge Creation?

Ideas

Science

Problems

→

Research | Methodological Publication

Change Thought and Practice

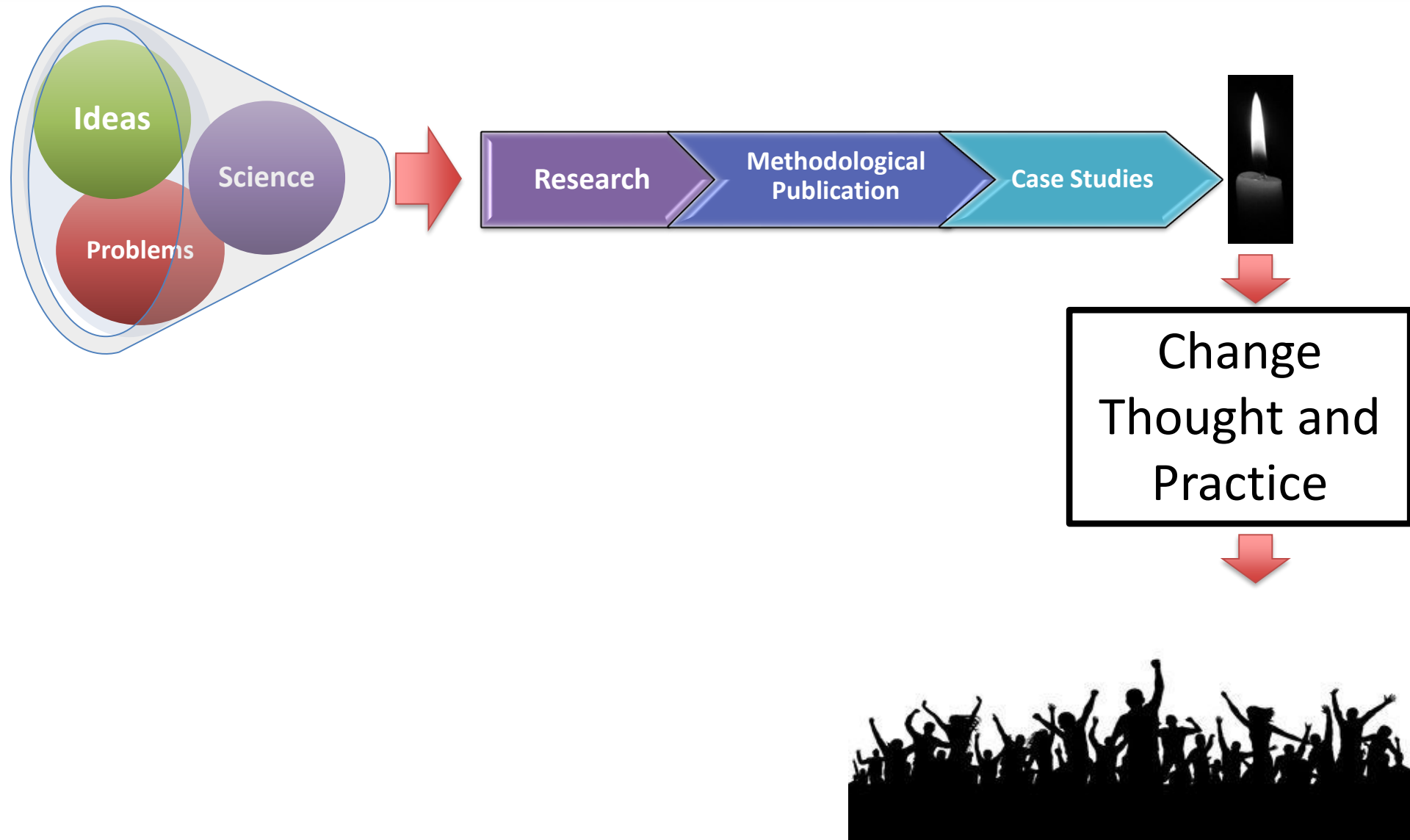FARMER SCHOOL OF BUSINESS
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If we focused on changing thought and practice, this is how others would feel when they read our methodological papers!

Much of what we find through Google, has not been curated, validated, or peer reviewed.

A suggestion to make this better…

Documenting for Knowledge Reuse…

First determine your audience:

1. Shared work producers: People working on your team.
   – Purpose is to keep track of work and create institutional memory.

2. Shared work practitioners: People doing similar work in different settings.
   – Purpose is to seek or to gain advice and share insights about a particularly interesting, challenging problem.

3. Novices seeking expertise: People with an occasional need for knowledge.
   – Purpose is to approximate the performance of experts

4. Secondary knowledge miners: People who seek to answer new questions or develop new knowledge
   – Purpose is knowledge creation.

Informal Poll

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Documenting for Knowledge Reuse…

What do they need to know?

1. How to do something and why it works.

2. Specific technical details about a methodology (Users share general body of knowledge, but may lack specifics).

3. Specific contextual knowledge about producer's setting (Users may have, but often lack contextual knowledge).

Documenting for Knowledge Reuse…

Recommendations for promoting successful reuse

1. Make it easy to locate (use appropriate titles, indexing, and searching capabilities).

2. Provide thorough training in analysis, synthesis, and drawing valid conclusions.

3. Verify all results.

4. Provide additional access to experts as well as packaged expertise.

5. Push packaged knowledge to appropriate recipients.

6. Provide appropriate incentives for contributions and reuse.

The JQT Case Study Section…

The main purpose of the JQT Case Study Section is to show how complex problems are addressed in practice and to motivate additional research in areas where existing methodologies may be inadequate to address the challenges presented in the problem or data.

The JQT Case Study Section…

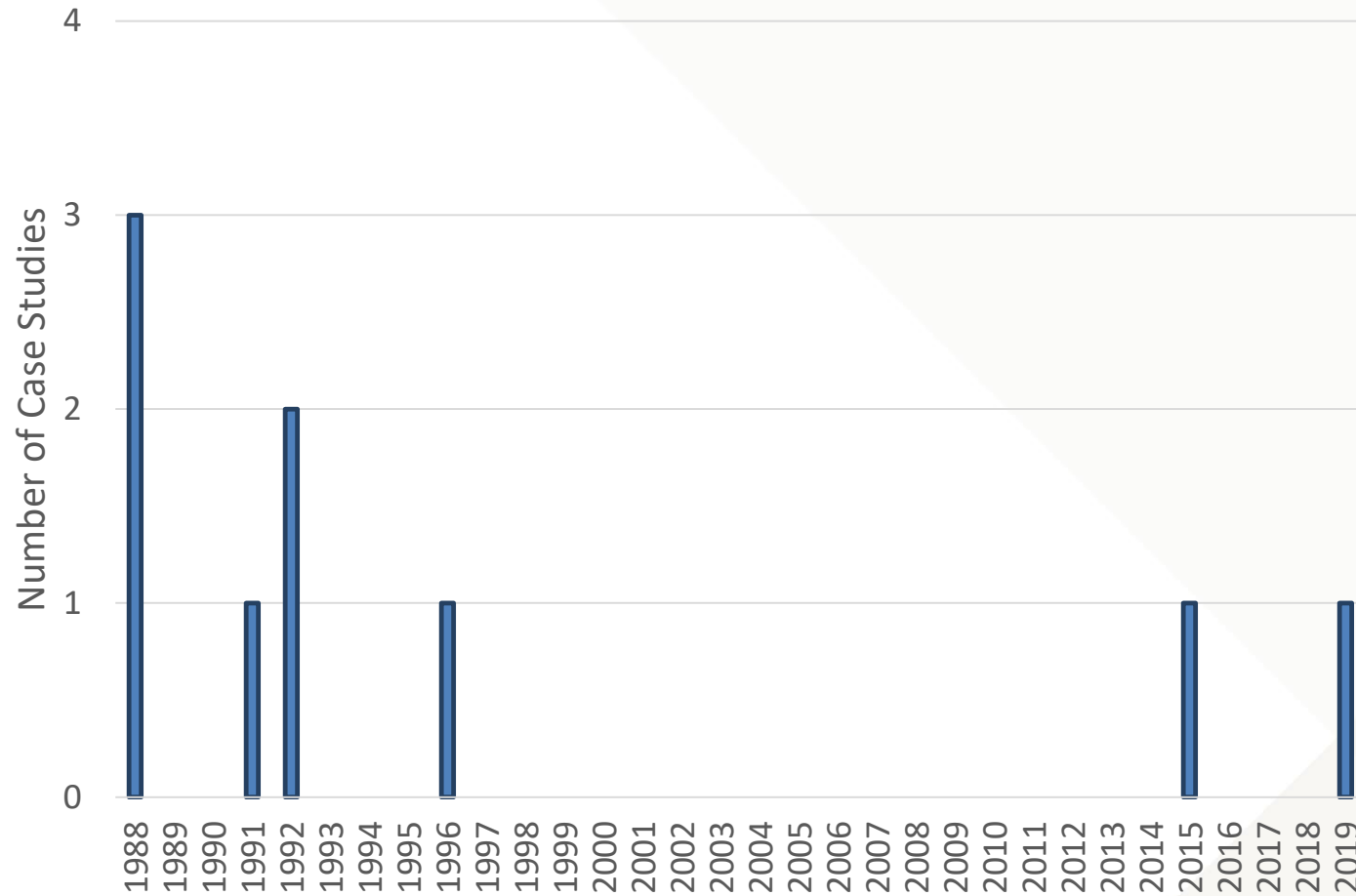<u>To be considered for publication</u>

- Focus on complex problem

- Use real data

- Illustrate innovative application of methodology

- Complete solution is not required, but insights are.

<u>To promote reproducibility (reuse)</u>

- Relevant and adequately commented code and relevant data are strongly recommended.
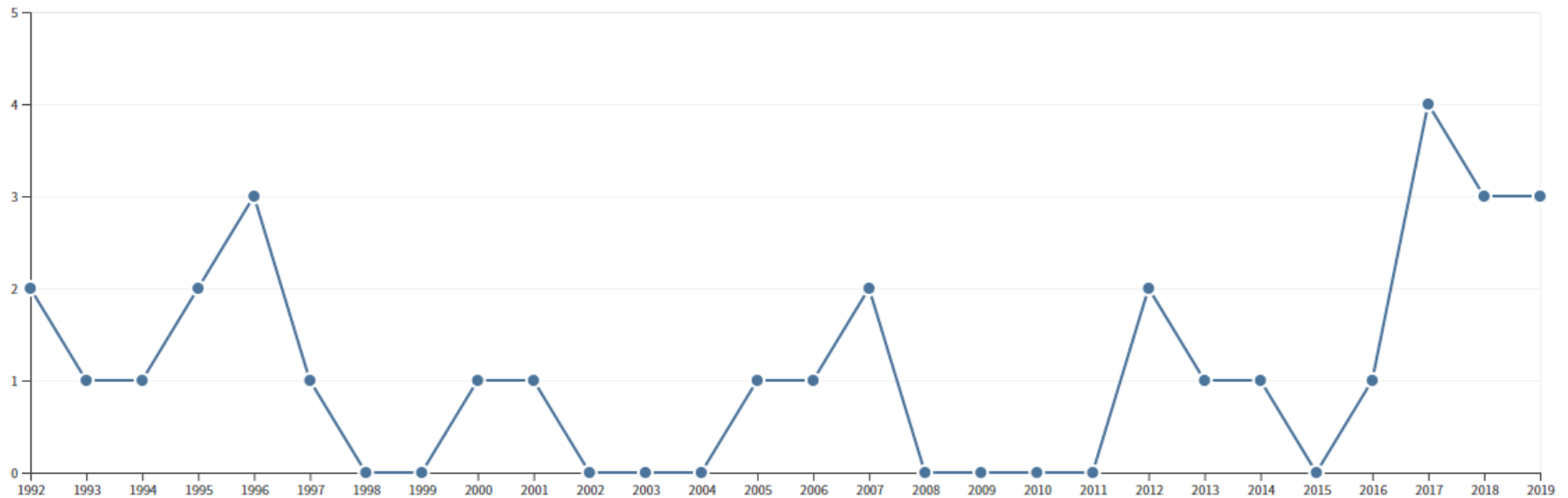
The JQT Case Study Section…

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Sum of Times Cited per Year

The JQT Case Study Section…

- How can we encourage case study submissions?

- How can we make case studies more impactful?