

The Emergence of the Knowledge Society and the Implications for Innovation Indicators

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Structure

Background

Emergence of the knowledge society

Observations on indicators

‘Fighting the last war’?

‘Dark innovation’

Opportunities in era of ‘big data’

Indicator dangers (the drunk & the lamp-post, McNamara’s fallacy, Goodhart’s law, excessive costs)

Conclusions

Background

NOT an expert in innovation indicators

Previously worked on science indicators

- Helped pioneer science indicators for policy use
- Study for UK Gov't & NSF on government funding of academic research

As Editor of *Research Policy*, overview of field of innovation studies

Have written about dangers of innovation studies failing to keep up with

- changing world
- changing nature of innovation

Aim = to set the scene rather than provide answers!

Emergence of the knowledge society

Live in era of

- globalisation (+ global problems)
- growing competition
- increasing complexity

Increased emphasis on innovation and on science and technology

Innovation

- taking place in different sectors (not just manufacturing)
- different organisations (not just firms)
- taking different forms (not just technological)

→ ***Are current innovation indicators adequate?***

Observations on indicators

All indicators are *partial*

- In world of social sc & policy, no perfect measures
- Indicators only capture certain aspects of phenomenon and only to a limited extent
- ‘Experts’ often tend to lose sight of such caveats
 - e.g. assume patents ‘measure’ innovation
 - But patents relate more to invention than innovation
 - Only used in certain sectors/technologies/types of innovation

For a given indicator, need ***conceptual clarity*** re what aspects of a given phenomenon it captures and what it neglects

- e.g. bibliometric indicators – relate to only one form of scientific output (publishing)
- Citations – relate to impact (on peers) rather than quality

Observations on indicators

Every indicator is based on many assumptions

- Most implicit
- Rarely subject to critical scrutiny
- Validity of those assumptions varies with circumstances and over time
- → Statistics and indicators – more an art than a science!

Statisticians and indicator producers (+ many users) tend to be inherently conservative

- Prefer long time-series even if comes at cost of growing distance from 'reality'

‘Fighting the last war’?

In rapidly changing world, danger that STI indicators failing to keep up

The way we conceptualise, define & measure ‘innovation’ reflects dominant forms of innovation when field of innovation studies was established in 1960s-80s, when most innovation was

- technology-based – drawing on S&T
- conducted by private firms
- in the manufacturing sector – especially ‘hi tech’ mfg

Innovation then captured (reasonably) via e.g.

- R&D spending
- No’s of QSEs
- Patents

‘Dark innovation’

But now, a lot of innovative activity

- not technological
- not based on R&D
- not reflected in patents
- not in manufacturing sector

Often largely ‘invisible’ with conventional indicators

Cf. cosmology – much of universe invisible – consists of dark matter or dark energy

‘Dark innovation’ – i.e. largely invisible with current innovation indicators

Challenge = to conceptualise, define and devise methods for measuring ‘dark innovation’ (Martin, 2016)

Opportunities in era of 'big data'

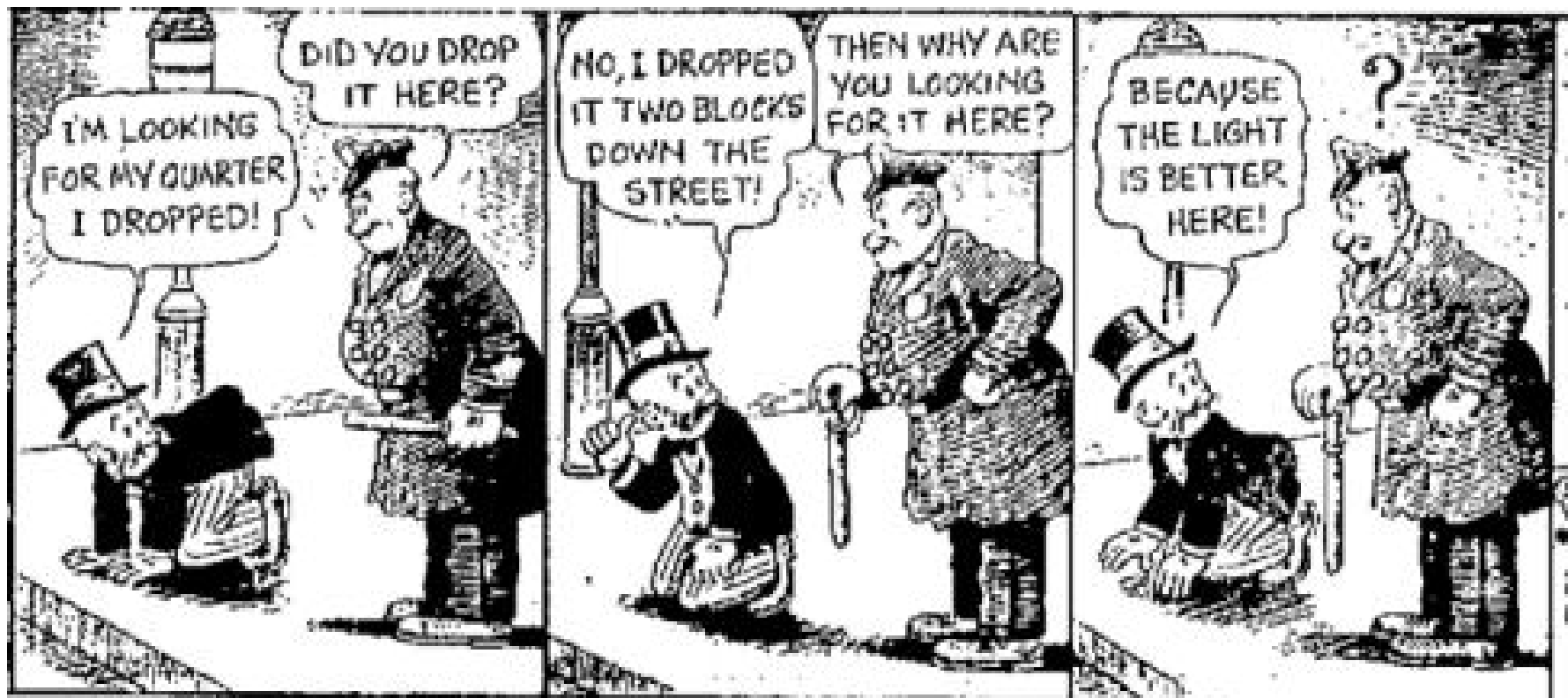
Compared with situation 3-4 decades ago, now far more & varied data available, including 'big data'

Opens up opportunities for developing new innovation indicators

But there are several dangers to be aware of

Indicator dangers

The drunk and the lamp-post



Indicator dangers

The drunk and the lamp-post

Temptation among indicator producers to focus on phenomena and characteristics where there is 'light'

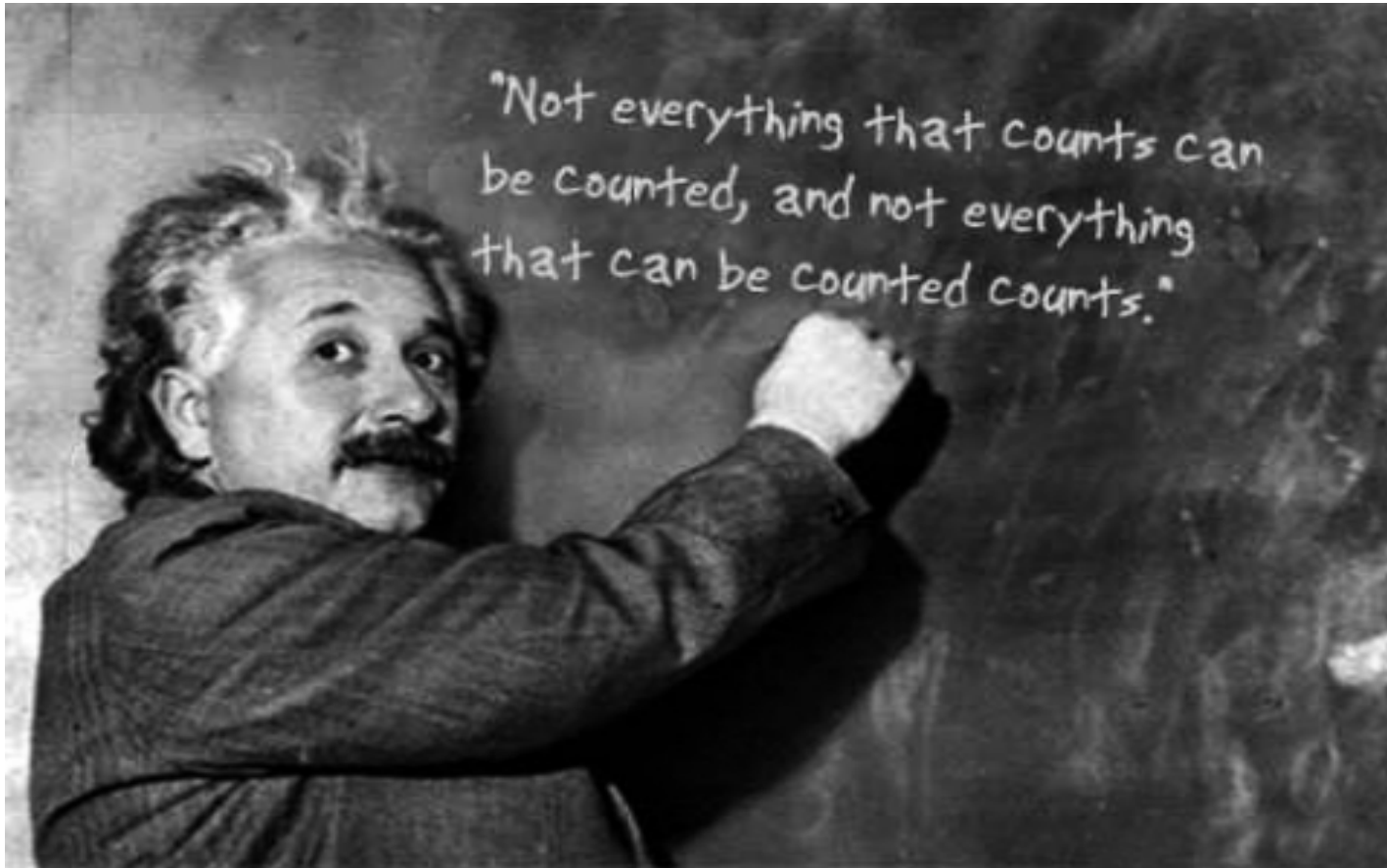
- i.e. data one can readily use to construct an indicator

Neglect of less easily measured (or non-measurable) aspects, even if equally or more important

Analogy with drunk looking for lost keys under the lamp-post ("because that's where the light/data is")

Indicator dangers

The 'Einstein' dictum



Correct attribution – Cameron (1963)

Indicator dangers

The McNamara Fallacy

“Making the measurable important rather than attempting to make the important measurable”
(Rowntree, 1987)

- e.g. body counts or tons of bombs dropped to measure ‘success’ in Vietnam War

The McNamara Fallacy

“The first step is to measure whatever can be easily measured.

This is OK as far as it goes.

The second step is to disregard that which can't be easily measured or to give it an arbitrary quantitative value.

This is artificial and misleading.

The third step is to presume that what can't be measured easily really isn't important.

This is blindness.

The fourth step is to say that what can't be easily measured really doesn't exist.

This is suicide.”

(Yankelovich, 1972 – but often attributed to Handy, 1994)

Indicator dangers

The McNamara Fallacy

“Making the measurable important rather than attempting to make the important measureable”
(Rowntree, 1987)

- e.g. body counts or tons of bombs dropped to measure ‘success’ in Vietnam War

Related to AN Whitehead’s ‘Fallacy of Misplaced Concreteness’ – i.e. “the error of mistaking the abstract for the concrete”

Indicator dangers

Goodhart's Law

Once a variable is adopted as a policy target, it rapidly loses its ability to 'capture' phenomenon or characteristic supposedly being measured

When you measure a system, you change it

- cf. Heisenberg Principle (also Hawthorne effect)

Once an innovation indicator adopted as part of a policy, →

- changes in behaviour with 'game-playing' to maximise score/benefit
- perverse incentives
- unintended consequences

Indicator dangers

Excessive costs

Fundamental boundary condition – benefits > costs

Development of indicators comes at significant cost

- Setting up
- Regular updating
- ‘Costs’ of unintended consequences (e.g. game-playing)

Various forces encouraging over-elaboration

- New public management, accountability, audit society
- Zeal of indicator developers (+ criticisms of existing indicators)

In some cases, costs may come to exceed benefits

- e.g. excessive application of bibliometric indicators → more research misconduct? (cf. VW saga)

Conclusions

In a knowledge-intensive society, innovation increasingly important

Growing variety of forms and locations

Current innovation indicators reflect primary forms of innovation of previous decades

Much innovative activity currently invisible or 'dark'

Need new indicators to capture

But in era of easily available or 'big' data, beware

- the temptation to search only under the 'lamp-post'
- the McNamara fallacy
- subsequent game-playing and unintended consequences

Remember – benefits of indicators must be $>$ costs

References

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