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# Research Relevance and Impact:

# Where's the Evidence?

# Overview

- Generating Impact
- Emergence of Evidence-Based Paradigm
- The Evidence-Based Practice/Research
- Evidence-Based Paradigm in IS
- Importance of Systematic Reviews (Secondary Studies)
- Importance of Empirical Primary Studies
- Delivering Impact
- Research Relevance and Impact
- Follow-Up Bibliography.

# Generating Impact

- For information systems research to have an impact it needs to be able to help practitioners make decisions and draw on evidence to answer questions that matter to them. Such as
  - What are the pitfalls to avoid when implementing a customer relationship management system for my type of organisation?
  - In what circumstances are MOOCs more effective than traditional teaching?
  - When is pair programming more productive than individual programming?
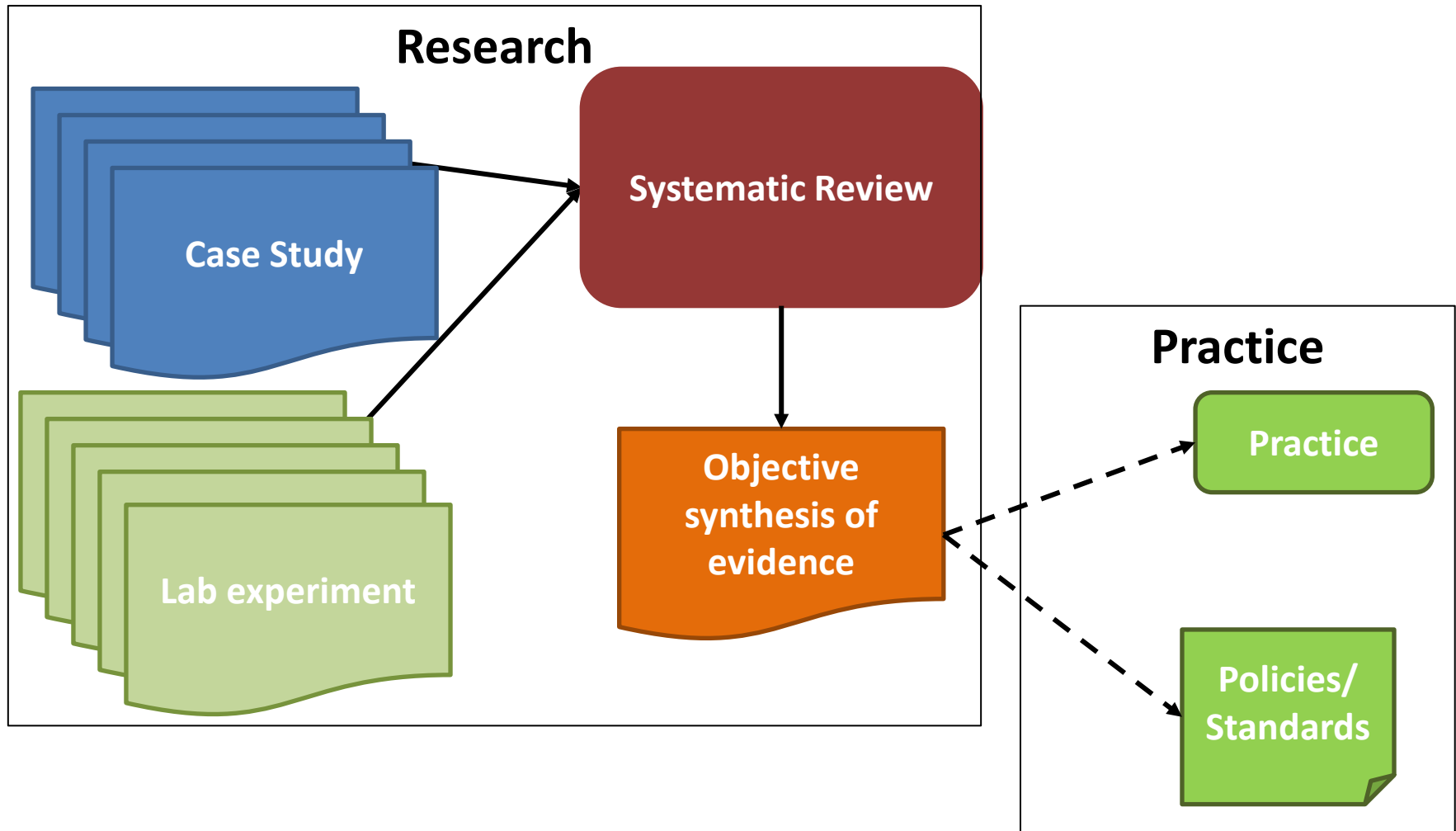  - Are there common failure patterns in public sector projects?

# Generating Impact

- For information systems research to have an impact it needs to be
  - rigorously undertaken,
  - clearly reported,
  - built upon by researchers, and
  - applied in practice.
  - The Evidence-Based Paradigm provides a structure in which to do this.
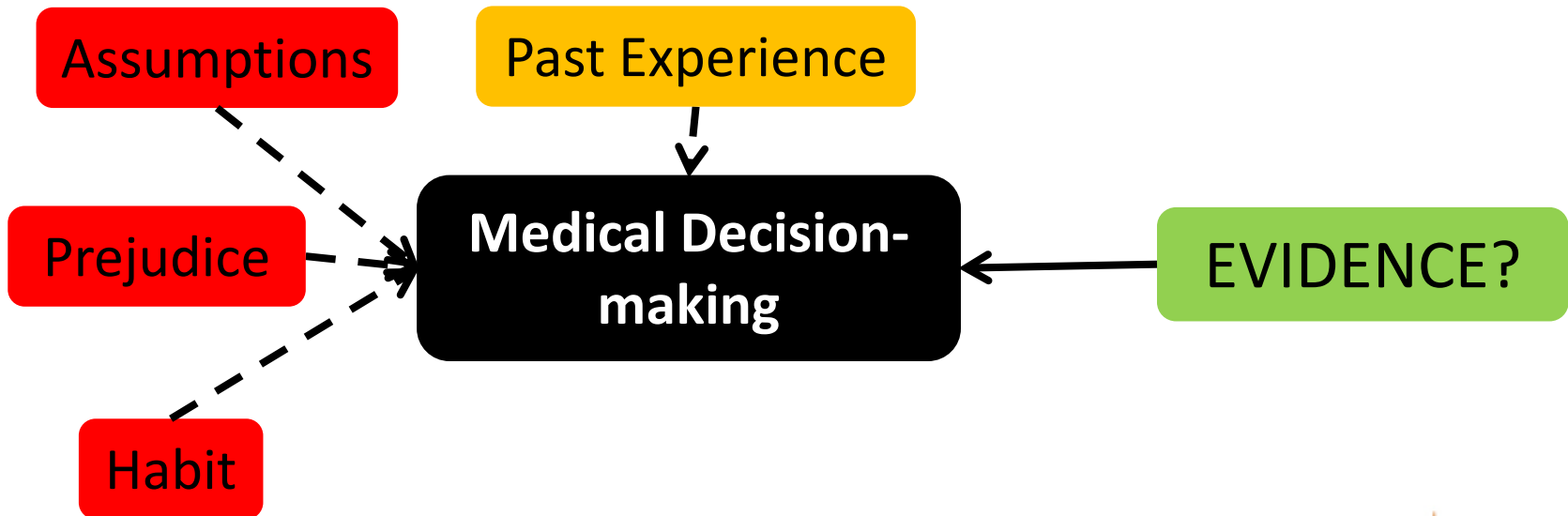
# Evidence Based Paradigm

Based on Kitchenham et al. (2015)

# Emergence of Evidence-Based Practice

- In 1990s Evidence-Based Medicine emerged.
  - e.g. Sackett et al (1996).
- Responding to concerns about idiosyncratic practitioner decision-making
  - Often lacked knowledge of relevant, up to date, research

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# Emergence of Evidence-Based Practice

EBM:

- Uses the best available research evidence
  - research must be conducted using a sound methodology
- Uses practitioner's expertise
- Includes client's views

Client's views

Available Research Evidence

Practitioner's expertise

**Medical Decision-making**

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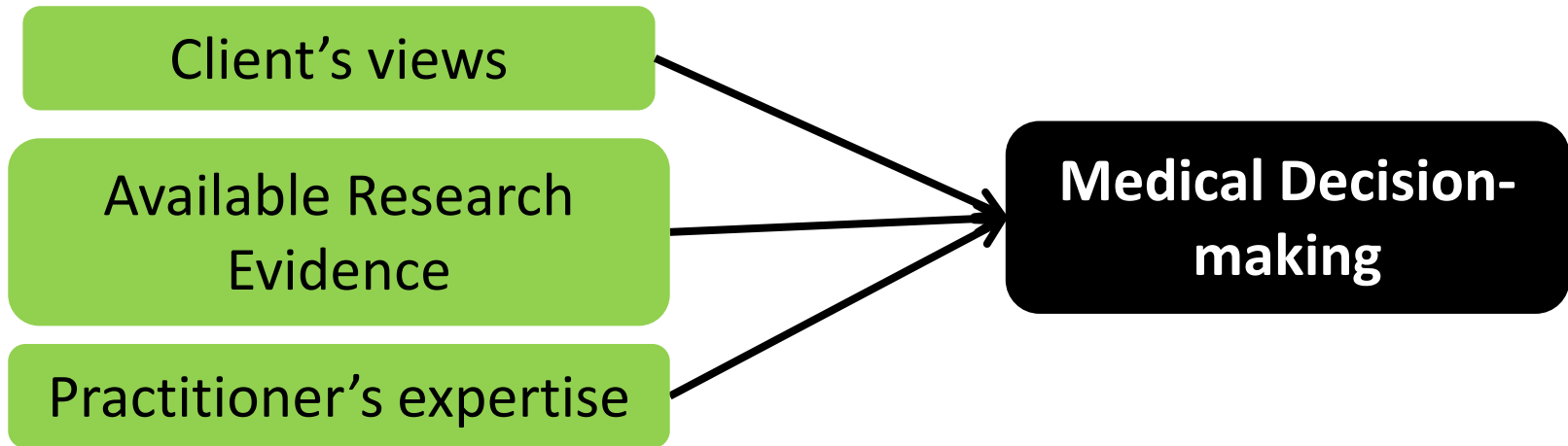
# Evidence-Based Practice/Research

- Evidence-Based Practice  adopted in other fields:
  - Education, Librarianship, Nursing, Policing, Social policy
  - More recently in Software Engineering
    - championed in UK by Brereton, Budgen, Kitchenham.
    - championed in Scandinavia by Cruzes, Dybå, Jørgensen.
- Evidence-Based Research  being called for and discussed in:
  - Information Systems
    - Initially by Atkins, Louw, Moody, Baskerville, Myers,
    - Childs, Edwards, Oates, Wainwright: seeking to develop a EBP community via EBIS journal

# The Evidence-Based Paradigm in IS

We define evidence based information systems (EBIS) as

- *"an approach to decision-making in the design, adoption and implementation of information systems*

- *that uses the best evidence available, from both practitioner expertise and systematic research,*

- *in consultation with all stakeholders"*

(Edwards et al., 2014).

| Practitioners' expertise |
| --- |

| Systematic research evidence |

| Stakeholder consultations |

**EBIS**
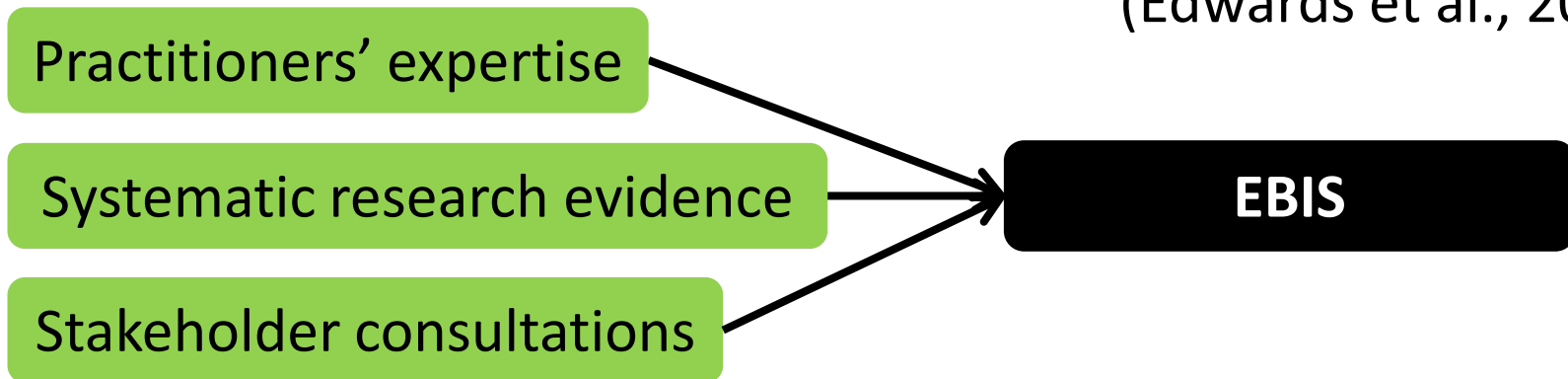
**To achieve this we need data-rich research and its synthesis**

# Importance of Systematic Reviews (Secondary Studies)
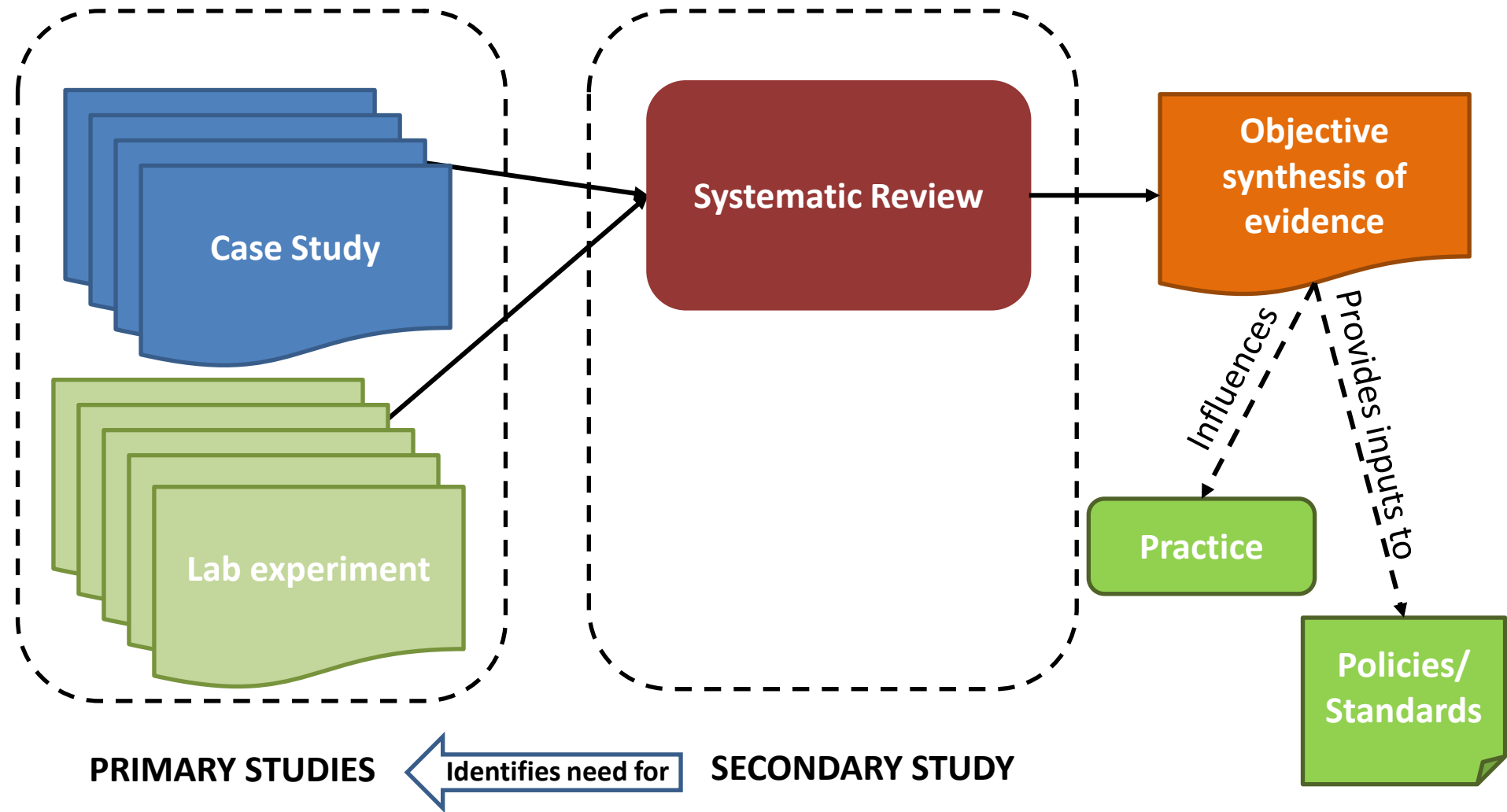


Case Study

Lab experiment

Systematic Review

Objective synthesis of evidence

Influences

Provides inputs to

Practice

Policies/ Standards

PRIMARY STUDIES ← Identifies need for SECONDARY STUDY

**Based on Kitchenham et al. (2015)**

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# Systematic Review:
## One Option - a Model-Driven SLR Process

Process of searching, selecting, evaluating still made visible

Process of testing, adapting & modifying the theory *also made visible*

Each study evaluated for rigour of evidence it offers for (parts of) the emerging synthesised theory

1. Devise tentative model

2. Define traceable and repeatable search strategy

3. Search for relevant primary studies

Articles' repository

4. Assess article's relevance to part(s) of the emerging model

Candidate articles

Rejected articles

**Iterative process**

5. Assess the quality of evidence in papers for supporting/contradicting the emerging model.

Relevant articles

6. Analyse the data for elements pertinent to specific parts of the emerging synthesised model.

7. Synthesise the studies into a refined model

8. Write up and disseminate.

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# Comparison: Traditional v. MD SLRs

| Traditional SLR | MD-SLR |
|---|---|
| Evidence: series of experiments | Evidence: set of case studies |
| Summative decision | Richer understanding |
| Prescriptive | Informative |
| Linear process | Iterative process |
| Suited to cause-effect research | Suited to complex situations |
| Suited to quantitative, positivist research | Suited to qualitative, interpretive research |

# Importance of Empirical Primary Studies



Robust methodology

Clear data & its analysis

Limitations of work
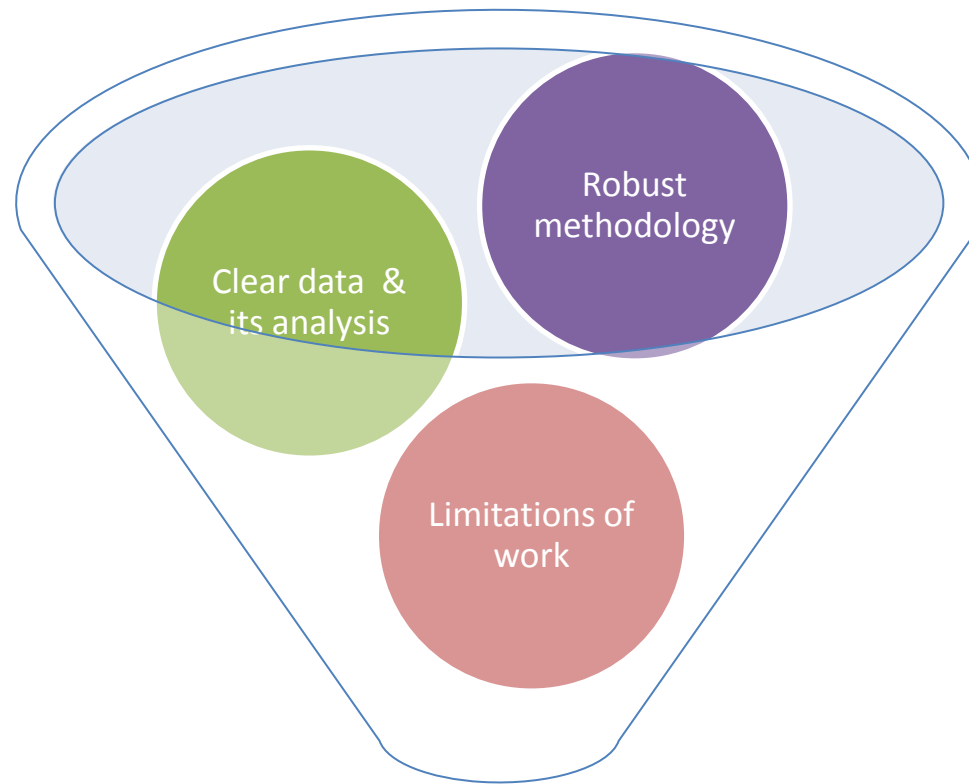
Stand alone results/

High quality inputs to Systematic Reviews

# Example
# Empirical Data about BPMN in Use

402 Papers returned

↓

20 Distinct papers

↓

12 case study/
experience reports

↓

generally limited
empirical data

**From (Oates et al., 2012)**

| Paper | Found in: |
|---|---|
| Auer et al, 2009 | CSDL |
| Bastide et al, 2010 | Inspec |
| Bhuiyan and Krishna, 2010 | AISeL |
| de la Vara and Sanchez, 2009 | Inspec |
| de la Vara et al, 2008 | Inspec |
| Green et al, 2005 | AISeL |
| Hernandez et al, 2010 | Inspec |
| Hinge et al, 2010 | Inspec |
| Linna et al, 2009 | IEEE Xplore, inspec |
| Overhage and Birkmeier, 2009 | AISeL |
| Patig and Casanova-Brito, 2011 | AISeL |
| Recker and Dreiling, 2011 | AISeL |
| Recker et al, 2006 | AISeL |
| Recker et al, 2010 | Business Source Elite, ingenta |
| Recker, 2010 | Inspec, ingentaconnect, Emerald |
| Siegeris and Grasl, 2008 | Inspec |
| Simmonds and Collins, 2010 | AISeL |
| Svagård and Farshchian, 2009 | Inspec |
| Zhu et al, 2008 | Inspec |
| zur Muehlen and Ho 2008 | IEEE Xplore, inspec, CSDL |

# Delivering Impact

- An evidence-based information systems (EBIS) community needs to be established
  - to do the primary and secondary research
  - to use findings to inform practice
  - to use practitioners' experience to feedback into research
- … this needs to be a collaborative activity
  - to deliver impact.

**Researchers**   **Practitioners**

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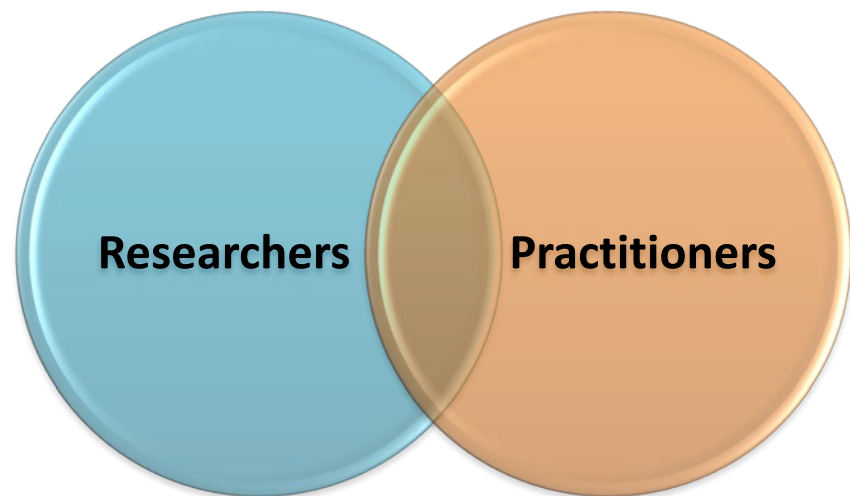
# Research Relevance and Impact

Where's the Evidence?

- Shared in accessible research publications?
- Shared with practitioners via other media?

Or

- Buried in journals/conference proceedings?
- Hidden in inaccessible technical reports?
- Restricted to individuals' experiences?

The challenge to you:

- Do meaningful empirical work .
- Synthesise primary studies to reveal "hidden knowledge".
- Write rigorous but accessible articles for varied audiences and publication media.

# Follow-up Bibliography

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Oates, B.J, Edwards, H.M and Wainwright, D. (2012). A Model-Driven Method for the Systematic Literature Review of Qualitative Empirical Research. *International Conference in Information Systems (ICIS2012)*

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Sackett, D. L., Rosenberg, W., Gray, J., Haynes, R. B., & Richardson, W. S. (1996). Evidence based medicine: what it is and what it isn't. *BMJ*, 312(7023), 71-72.