Scientific Research in Information Systems: A Beginner's Guide (2nd edition)

Teaching Materials

Created by Professor Jan Recker

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Overview

Content
Part 1: Basic Principles of Research
Part 2: Conducting Research
Part 3: Publishing Research

Chapter 2:
Information Systems Research as a Science

What have we covered in the last session?

- What is research?
- What is information systems as a research field?
- Why is research hard?

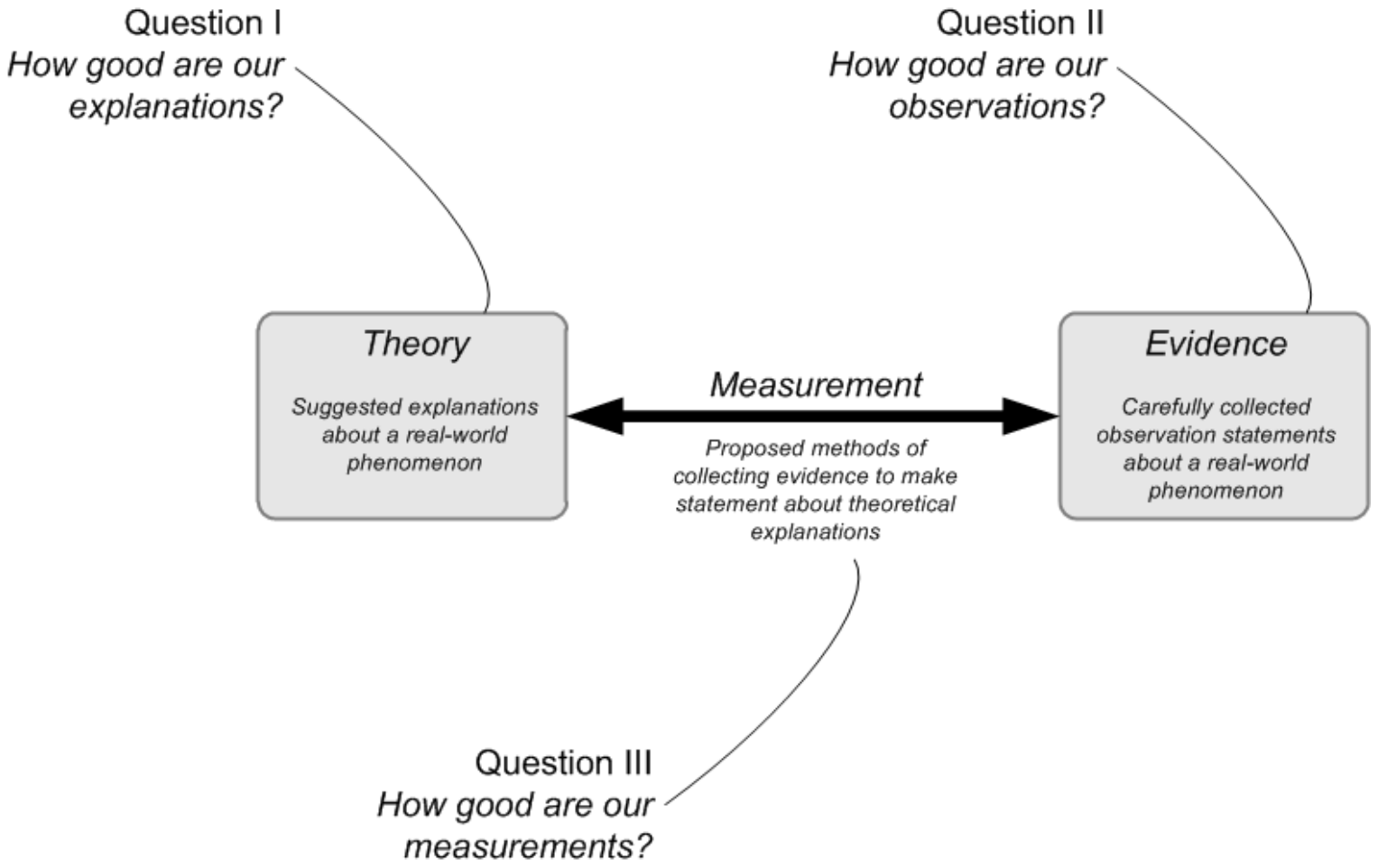
What do we cover in this session?

- What are knowledge contributions we make through research?
- What are principles of science?
- How do we construct research questions worth pursuing?

How do you create new knowledge?

- The body of knowledge is the current accumulation of **theories**, **evidence** and **methods** in a certain domain (e.g. medicine, management, education etc).
- Typically consists of theories that have been evidenced – i.e., not falsified (yet).
- Also consists of methods that have been used to evidence or falsify theories.
- Sometimes can be innovative and important new evidence.
- Is available in the scientific community in the form of paper, articles and books.

What is the body of knowledge?



Examples for IS research that address questions I, II or III

- From my own work
  - **Question 1**:
    - Seidel, S., Recker, J., and vom Brocke, J. "Sensemaking and Sustainable Practicing: Functional Affordances of Information Systems in Green Transformations", *MIS Quarterly (37:4) 2013, pp. 1275-1299.*
  - **Question 2**:
    - Recker, J. and Lekse, D. "A Field Study of Spatial Preferences in Enterprise Microblogging", *Journal of Information Technology (31) 2016.*
  - **Question 3**:
    - Schmiedel, T., vom Brocke, J., and Recker, J. "Development and Validation of an Instrument to Measure Organizational Cultures' Support of Business Process Management", *Information & Management (51:1) 2014, pp. 43-56.*

Example Question 2:

Implementing Enterprise Social Networks at Woolworths Group

Recker, J., & Lekse, D. (2016). A field study of spatial preferences in enterprise microblogging. *Journal of Information Technology, 31(2), 115-129.*

Woolworths deploys 890 iPads for 'happier' store managers

Summary: *The supermarket chain has given store managers across the country 3G-enabled iPads to reduce the time they have to spend doing tedious administration work in back offices.*

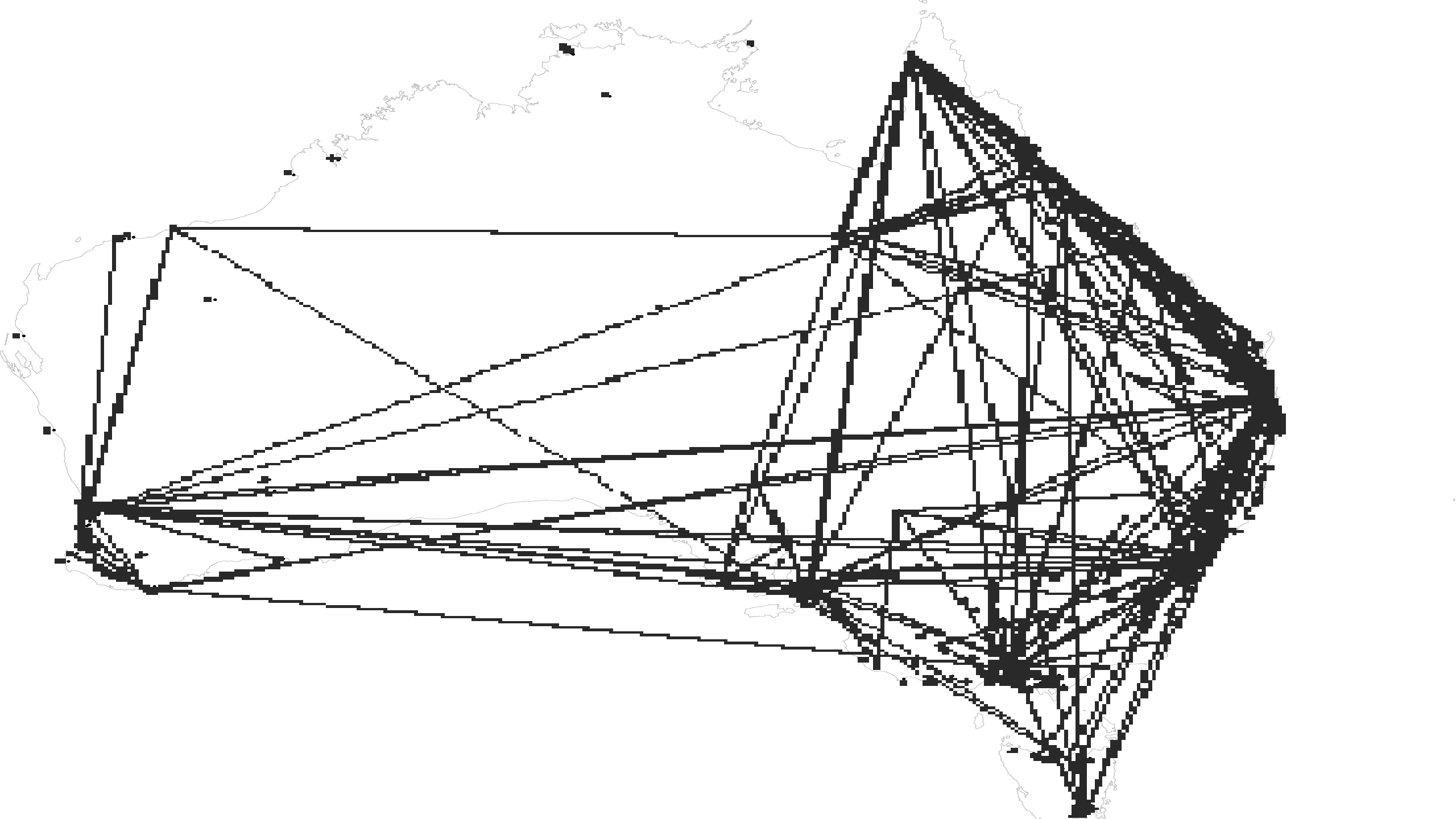
By Spandas Lui | August 21, 2012 -- 02:11 GMT (12:11 AEST)

Supermarket giant Woolworths has rolled out Apple iPads to its 890 store managers across the country.

Woolworths ran an iPad pilot program with 90 area managers 12 months ago to resounding success, and last week decided to go ahead with a wider implementation program, as first reported by *The Australian* (http://www.theaustralian.com.au/australian-it/it-business/ipads-to-save-woolies-millions/story-e6frganx-1226454418166) .

One of the biggest time wasters for Woolworths store managers is administration tasks, such as back-end reporting and stock management. Previously, these were performed through desktops in back offices.

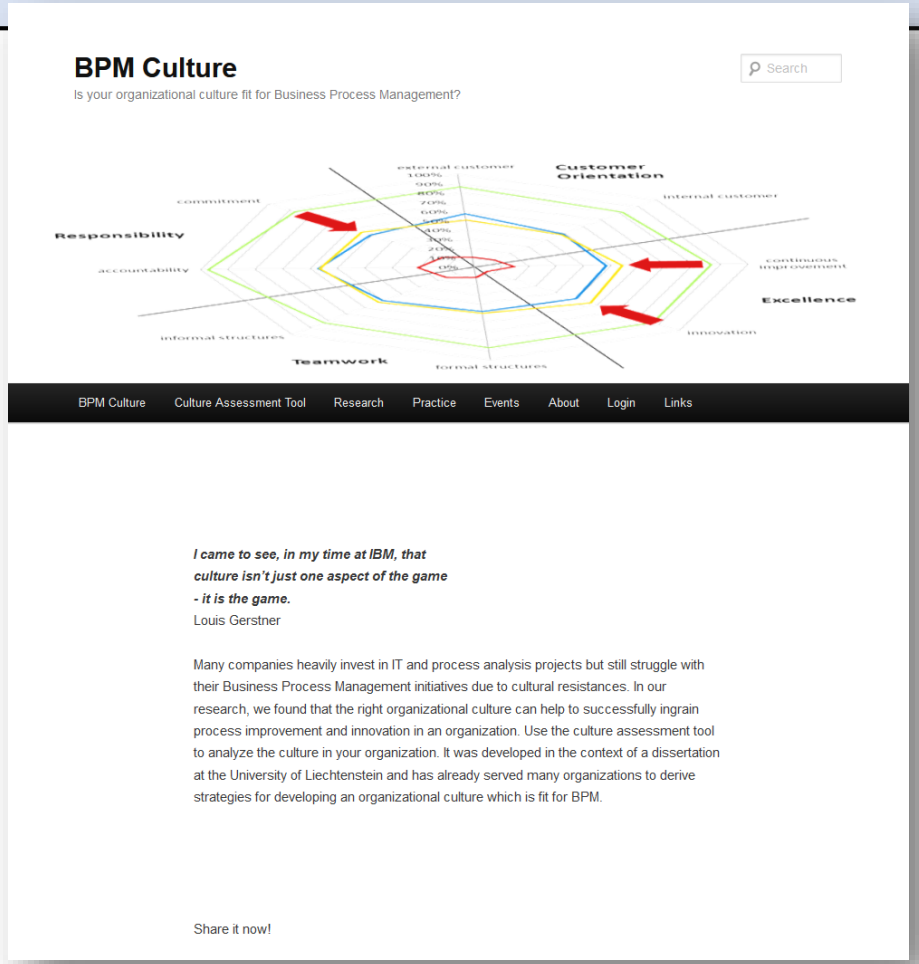
The third-generation 3G-enabled 16GB iPads, deployed on 17 August, have been filled with bespoke applications that allow store managers to do those tedious administration tasks as they roam around their store floor.



Example Question 3:

http://www.bpm-culture.org

Can we measure whether an organization's culture is ready for Business Process Management?



Schmiedel, T., vom Brocke, J., & Recker, J. (2014). Development and Validation of an Instrument to Measure Organizational Cultures' Support of Business Process Management. *Information & Management, 51(1), 43-56.*

Example Question 3:

- The following four cultural values and their subdimensions are critical to the success of BPM initiatives:

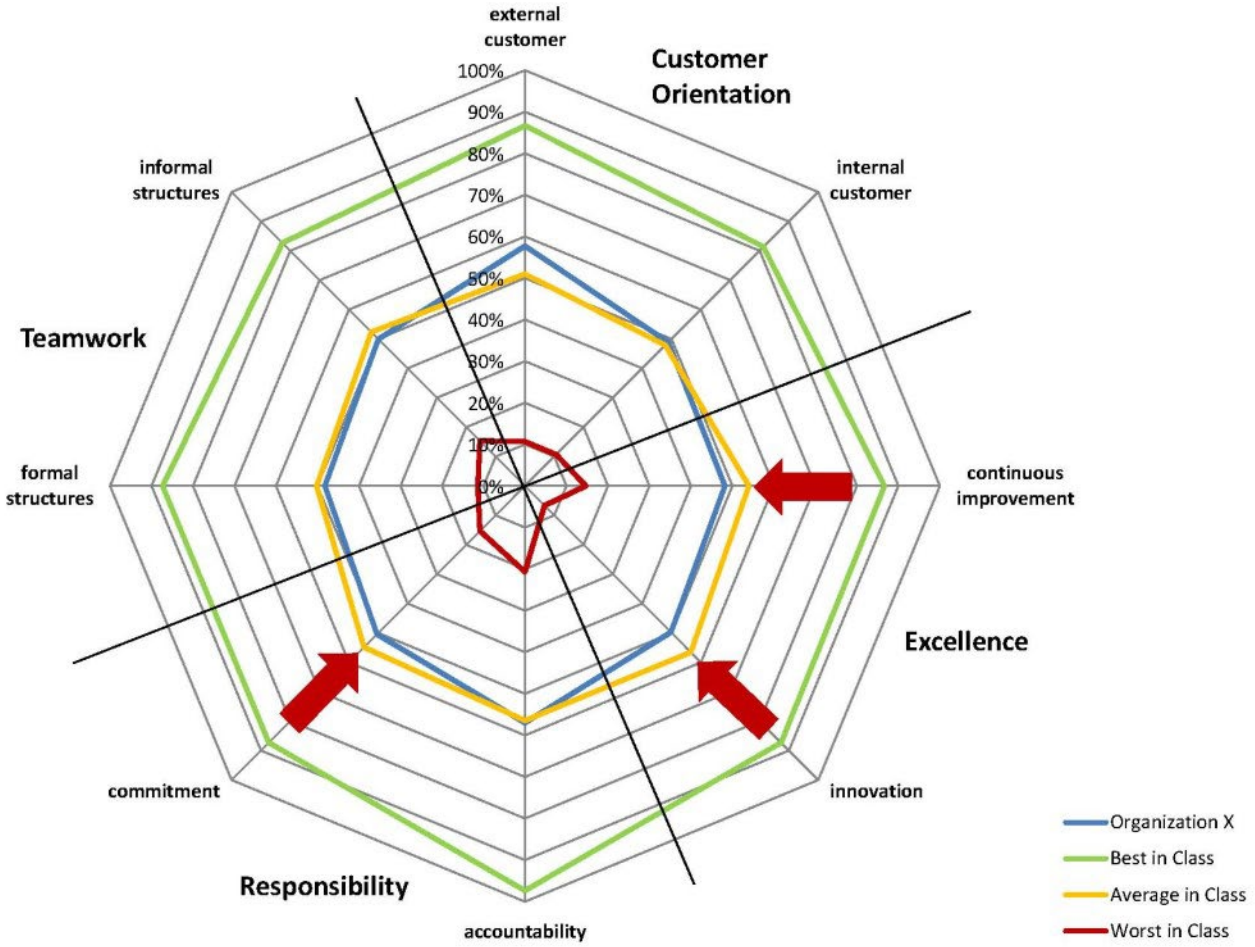
- **Customer Orientation**
  To what extent does the organization take the perspective of **external customers**?
  To what extent does the organization take the perspective of **internal customers**?
- **Excellence**
  To what extent is the organization open for continuous process **improvement**?
  To what extent is the organization open for process **innovations**?
- **Responsibility**
  To what extent does the organization foster **accountability** to process objectives?
  To what extent does the organization foster **commitment** to process objectives?
- **Teamwork**
  To what extent do **formal structures** support cross-departmental teamwork?
  To what extent do **informal structures** support cross-departmental teamwork?

Schmiedel, T., vom Brocke, J., & Recker, J. (2014). Development and Validation of an Instrument to Measure Organizational Cultures' Support of Business Process Management. *Information & Management, 51(1), 43-56.*

Example Question 3:

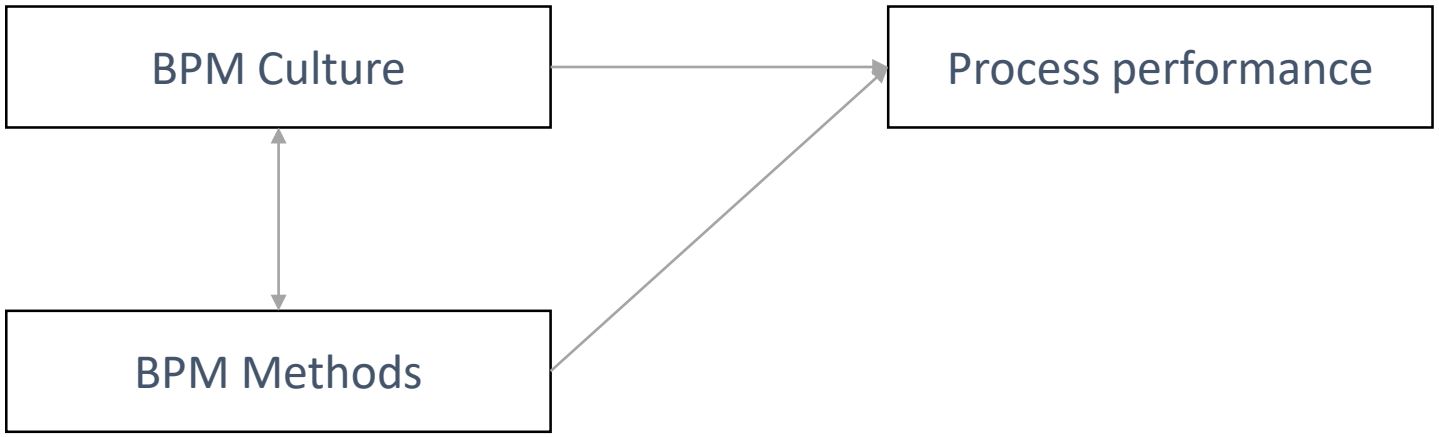
http://www.bpm-culture.org/limesurvey3/index.php/275895?newtest=Y&lang=en

- ✓ Hilti
- ✓ Ivoclar Vivadent
- ✓ Landesbank Berlin
- ✓ Lufthansa Technik
- ✓ Oerlikon Balzers
- ✓ Oerlikon Mechatronics
- ✓ ThyssenKrupp Presta



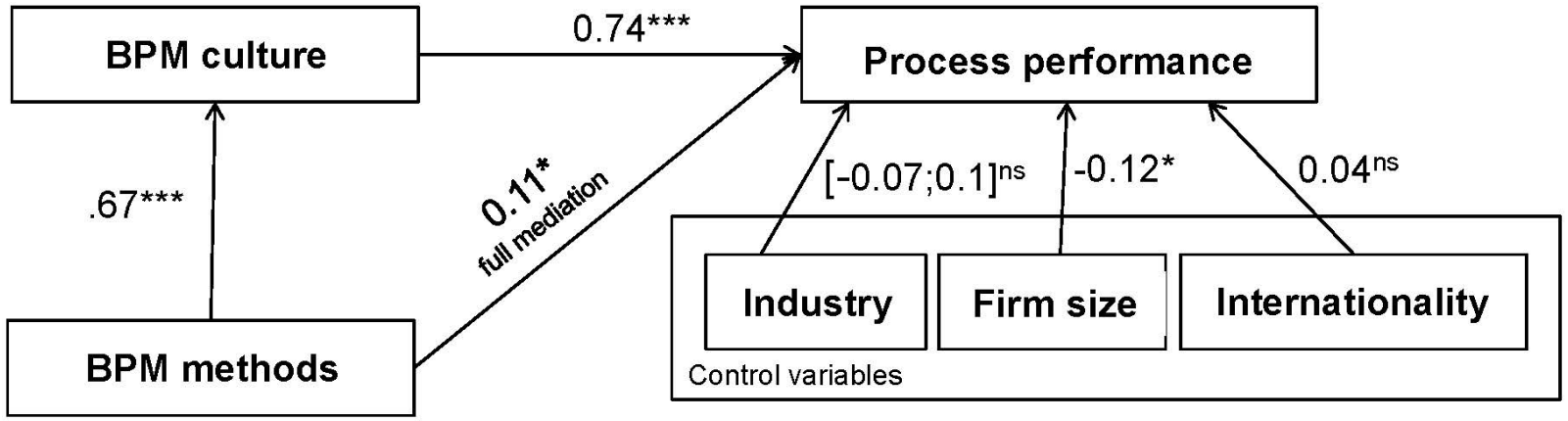
Schmiedel, T., vom Brocke, J., & Recker, J. (2014). Development and Validation of an Instrument to Measure Organizational Cultures' Support of Business Process Management. *Information & Management, 51(1), 43-56.*

What one can do with better measures



Schmiedel, T., Recker, J., & vom Brocke, J. (2020). The Relation between BPM Culture, BPM Methods, and Process Performance: Evidence from Quantitative Field Studies. *Information & Management, 57(2), 103175.* https://doi.org/10.1016/j.im.2019.103175

What one can do with better measures



*** p < 0.001; * p < 0.05

Schmiedel, T., Recker, J., & vom Brocke, J. (2020). The Relation between BPM Culture, BPM Methods, and Process Performance: Evidence from Quantitative Field Studies. *Information & Management, 57(2), 103175.* https://doi.org/10.1016/j.im.2019.103175

Doing IS Research "Scientifically"

- Let's start with understanding the vocabulary

What is Science

- *“the intellectual and practical activity encompassing the systematic study of the structure and behavior of the physical and natural world through observation and experiment.”*

- The **goal of science** is to discover laws and propose theories that can explain [natural or social, tangential or latent] phenomena in the worlds that concern us.

  - Mostly real worlds but also imaginary, virtual or perceived worlds.

- Scientific inquiry attempts to provide **principles that govern the research process** and allow you to distinguish science from other forms of research.

What is Science

- *What is important to realize:*

  - *Science is both a **product** and a **process***
    - *Product: the body of knowledge*
    - *Process: doing things scientifically*
  - *It is exciting (science = discovery of new)*
  - *It is ongoing (science = never finished)*

Information Systems Research as a Science is a product.

- IS research is a **social science**
  - involves people, and the relationships between them and other things (in particular IT artefacts)
  - studies “IT in (social) use”: individuals, groups, organizations, networks, communities, societies
  - invariably includes measurement error
    - Phenomena as well as measurements are often vague, imprecise, non-deterministic, and ambiguous.
  - is open to methodological and paradigmatic pluralism:
    - quantitative and qualitative
    - positivist and interpretive
    - Descriptive, explanatory, predictive, and prescriptive

Information Systems Research as a Science is a product.

- **Science is ongoing**:
- All scientific knowledge is a set of suggestions.
  - Describes the current accumulation of what we know, what we can measure, what we purport to explain.
- Examples:
  - Is the earth flat? Is it round?
  - Is Pluto a planet?

Information Systems Research as a Science is a process.

- How do we do science?
- Scientists have developed a pattern for doing science. This pattern relies on systematically testing to see if what we think about the universe, is in fact, real.
- What are the characteristics of these patterns/the ‘scientific way of doing things’?

What are principles of science?

- Replicability
  - the procedures by which research outputs are created should be conducted and documented in a manner that allows others outside the research team to independently repeat the procedures and obtain similar, if not identical, results.

- Where is this of relevance? Do we know famous examples?

Replicability

http://www.nature.com/news/over-half-of-psychology-studies-fail-reproducibility-test-1.18248

nature International weekly journal of science

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Over half of psychology studies fail reproducibility test

Monya Baker

27 August 2015

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Don't trust everything you read in the psychology literature. In fact, two thirds of it should probably be distrusted.

In the biggest project of its kind, Brian Nosek, a social psychologist and head of the Center for Open Science in Charlottesville, Virginia, and 269 co-authors repeated work reported in 98 original papers from three psychology journals, to see if they independently came up with the same results.

The studies they took on ranged from whether expressing insecurities perpetuates them to

Brian Nosek's team set out to replicate scores of studies.

Killer landslides

The lasting legacy of Nepal's quake

A year after a devastating earthquake triggered killer avalanches and rock falls in Nepal, scientists are wiring up mountainsides to forecast hazards.

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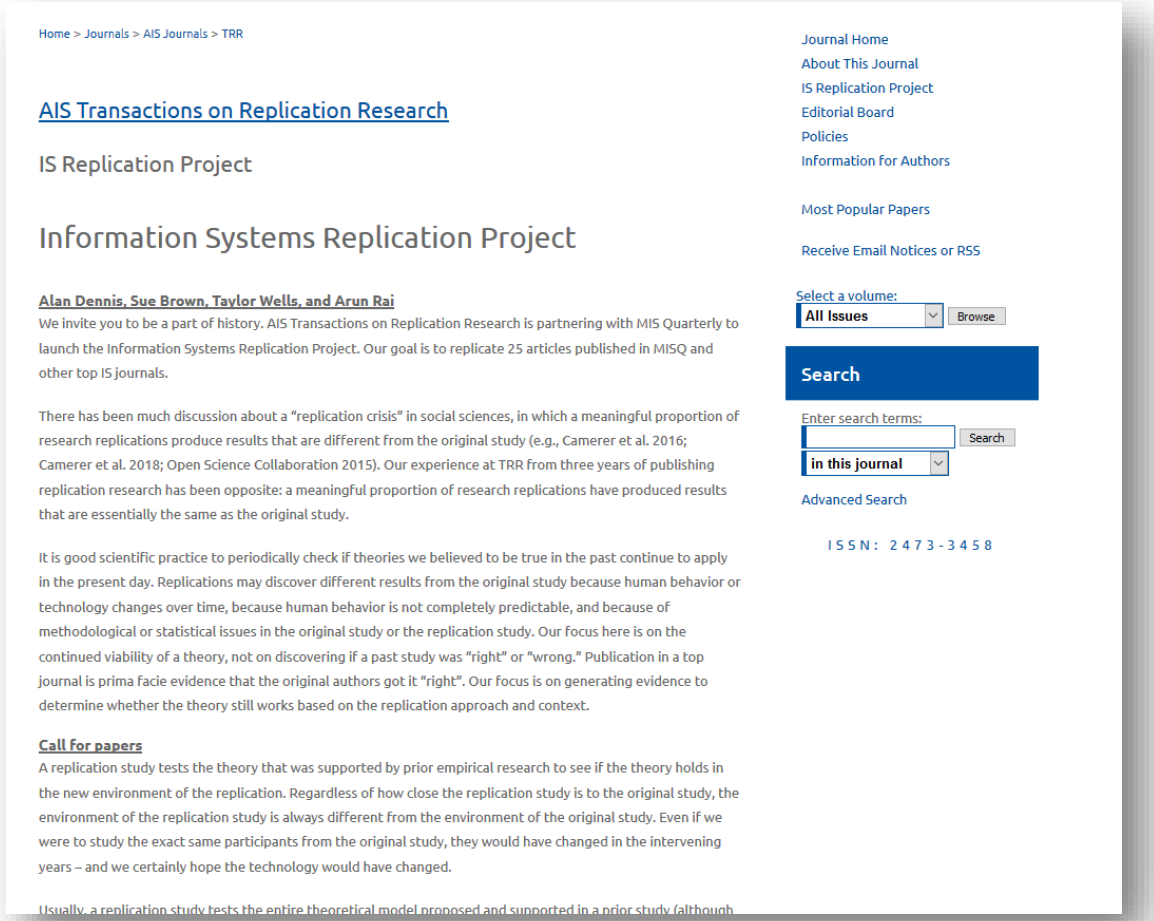
Replicability in IS



Home > Journals > AIS Journals > TRR

AIS Transactions on Replication Research

IS Replication Project

Information Systems Replication Project

Alan Dennis, Sue Brown, Taylor Wells, and Arun Rai

We invite you to be a part of history. AIS Transactions on Replication Research is partnering with MIS Quarterly to launch the Information Systems Replication Project. Our goal is to replicate 25 articles published in MISQ and other top IS journals.

There has been much discussion about a "replication crisis" in social sciences, in which a meaningful proportion of research replications produce results that are different from the original study (e.g., Camerer et al. 2016; Camerer et al. 2018; Open Science Collaboration 2015). Our experience at TRR from three years of publishing replication research has been opposite: a meaningful proportion of research replications have produced results that are essentially the same as the original study.

It is good scientific practice to periodically check if theories we believed to be true in the past continue to apply in the present day. Replications may discover different results from the original study because human behavior or technology changes over time, because human behavior is not completely predictable, and because of methodological or statistical issues in the original study or the replication study. Our focus here is on the continued viability of a theory, not on discovering if a past study was "right" or "wrong." Publication in a top journal is prima facie evidence that the original authors got it "right". Our focus is on generating evidence to determine whether the theory still works based on the replication approach and context.

Call for papers

A replication study tests the theory that was supported by prior empirical research to see if the theory holds in the new environment of the replication. Regardless of how close the replication study is to the original study, the environment of the replication study is always different from the environment of the original study. Even if we were to study the exact same participants from the original study, they would have changed in the intervening years – and we certainly hope the technology would have changed.

Usually, a replication study tests the entire theoretical model proposed and supported in a prior study (although

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AIS Transactions on Replication Research

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AIS Transactions on Replication Research

Editors

Editors-in-Chief: Sue Brown, University of Arizona
Alan Dennis, Indiana University

Follow

The mission of *TRR* is to publish reports of Information Systems replication studies until scientific consensus is reached. All topics in IS are open for consideration and articles will either support the findings of the original article or provide results that do not support the original article (e.g., non-significance). Either outcome will advance science in the Information Systems discipline as the results may validate previous findings or trigger additional replications and new follow-on research in other journals that seek to understand in what contexts the theory applies and why the original findings are only generalizable to those contexts.

Authors are strongly encouraged to read our founding editorial that argues for the importance of replication. It is available at http://aisel.aisnet.org/trr/vol1/iss1/ or here.

To submit a manuscript, read the "Information for Authors" and "Policies" pages, then go to http://mc.manuscriptcentral.com/ais-trr.

In the news

On August 27, 2015, the New York Times reported that over 250 researchers as part of the Reproducibility Project attempted to replicate 100 published psychology experiments but were only able to replicate the results of 35 of the studies.

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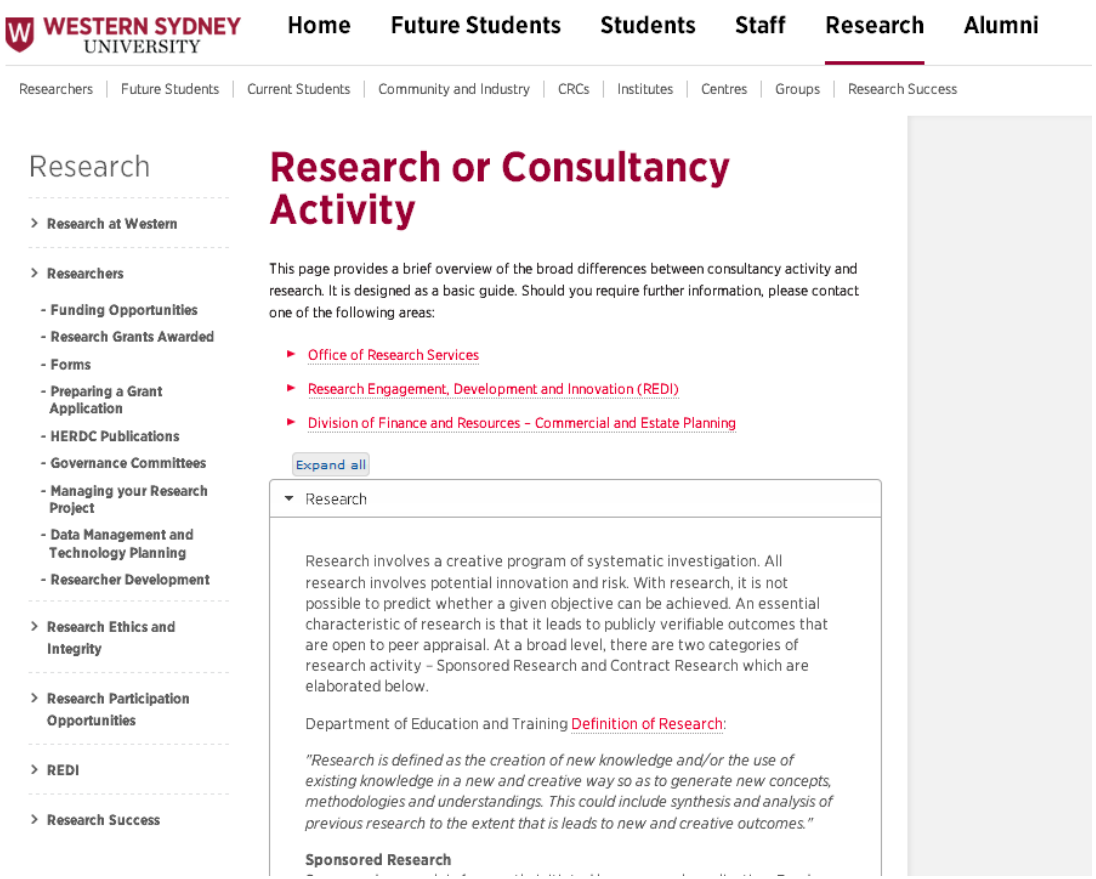
What are principles of science?

- Independence
  - concerns the extent to which the research conduct is impartial and freed from any subjective judgment or other bias stemming from the researcher or research team itself.

- Where is this of relevance? Do we know famous examples?

Independence Example: Research or Consulting?



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  - Managing your Research Project
  - Data Management and Technology Planning
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- Research Ethics and Integrity
- Research Participation Opportunities
- REDI
- Research Success

Research or Consultancy Activity

This page provides a brief overview of the broad differences between consultancy activity and research. It is designed as a basic guide. Should you require further information, please contact one of the following areas:

- Office of Research Services
- Research Engagement, Development and Innovation (REDI)
- Division of Finance and Resources – Commercial and Estate Planning

Expand all

Research

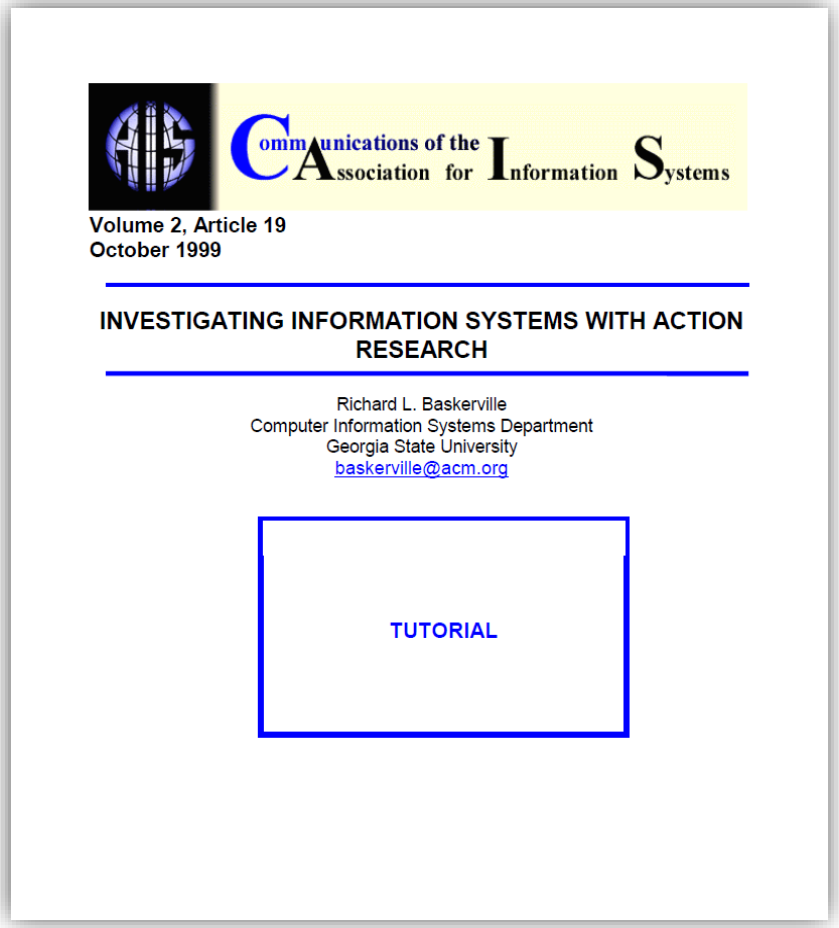
Research involves a creative program of systematic investigation. All research involves potential innovation and risk. With research, it is not possible to predict whether a given objective can be achieved. An essential characteristic of research is that it leads to publicly verifiable outcomes that are open to peer appraisal. At a broad level, there are two categories of research activity – Sponsored Research and Contract Research which are elaborated below.

Department of Education and Training Definition of Research:

"Research is defined as the creation of new knowledge and/or the use of existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings. This could include synthesis and analysis of previous research to the extent that is leads to new and creative outcomes."

Sponsored Research

Independence in IS



Communications of the Association for Information Systems

Volume 2, Article 19
October 1999

INVESTIGATING INFORMATION SYSTEMS WITH ACTION RESEARCH

Richard L. Baskerville
Computer Information Systems Department
Georgia State University
baskerville@acm.org

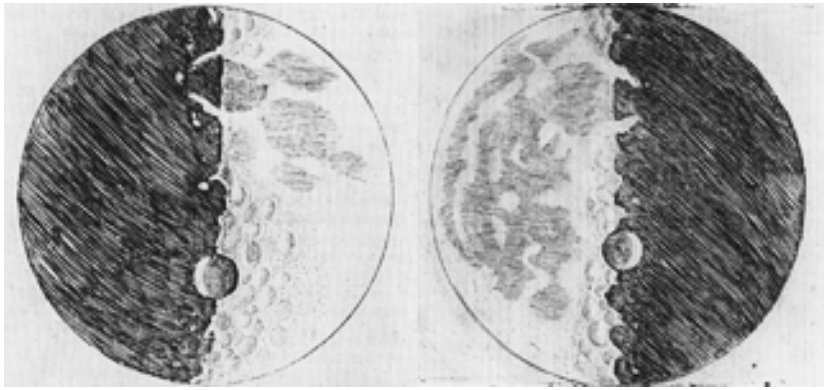
TUTORIAL

What are principles of science?

- Precision
  - in all scientific research the concepts, constructs, and measurements should be as carefully and precisely defined as possible to allow others to use, apply, and challenge the definitions, concepts, and results in their own work.

- Where is this of relevance? Do we know famous examples?

Precision: Example



Precision in IS

MIS Quarterly

RESEARCH ARTICLE

TUNING OUT SECURITY WARNINGS: A LONGITUDINAL EXAMINATION OF HABITUATION THROUGH fMRI, EYE TRACKING, AND FIELD EXPERIMENTS[1]

Anthony Vance, Jeffrey L. Jenkins, Bonnie Brinton Anderson
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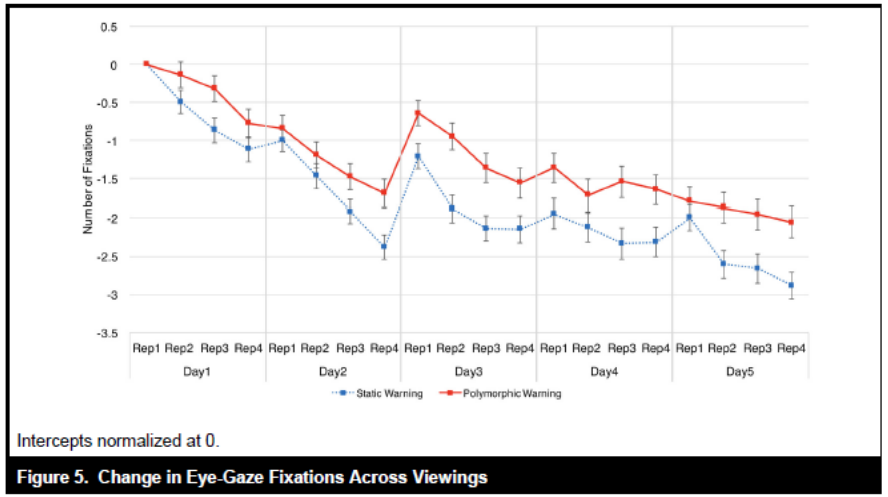
Research in the fields of information systems and human-computer interaction has shown that habituation—decreased response to repeated stimulation—is a serious threat to the effectiveness of security warnings. Although habituation is a neurobiological phenomenon that develops over time, past studies have only examined this problem cross-sectionally. Further, past studies have not examined how habituation influences actual security warning adherence in the field. For these reasons, the full extent of the problem of habituation is unknown.

We address these gaps by conducting two complementary longitudinal experiments. First, we performed an experiment collecting fMRI and eye-tracking data simultaneously to directly measure habituation to security warnings as it develops in the brain over a five-day workweek. Our results show not only a general decline of participants' attention to warnings over time but also that attention recovers at least partially between workdays without exposure to the warnings. Further, we found that updating the appearance of a warning—that is, a polymorphic design—substantially reduced habituation of attention.

Second, we performed a three-week field experiment in which users were naturally exposed to privacy permission warnings as they installed apps on their mobile devices. Consistent with our fMRI results, users' warning adherence substantially decreased over the three weeks. However, for users who received polymorphic permission warnings, adherence dropped at a substantially lower rate and remained high after three weeks, compared to users who received standard warnings. Together, these findings provide the most complete view yet of the problem of habituation to security warnings and demonstrate that polymorphic warnings can substantially improve adherence.

Keywords: Security warnings, habituation, information security behavior, functional magnetic resonance imaging (fMRI), eye tracking, longitudinal experimental design, field experiment, mobile computing, NeuroIS



Intercepts normalized at 0.

Figure 5. Change in Eye-Gaze Fixations Across Viewings

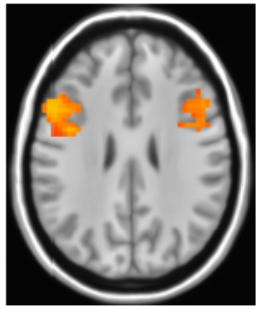


Figure 6. Left and Right Inferior Frontal Gyri

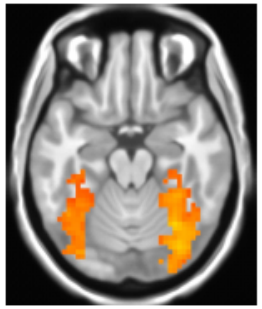


Figure 7. Left and Right Ventral Visual Pathways

What are principles of science?

- Falsification
  - describes the logical possibility than an assertion, hypothesis, or theory can be contradicted by an observation or other outcome of a scientific study or experiment.

- Where is this of relevance? Do we know famous examples?

Falsification: Examples

- Religion: “God’s love is incomprehensible”
- Rain Dance Ceremony: “if you are pure of heart and you do the rain dance ceremony correctly, it will rain tomorrow”
- Disruptive Innovation

Clayton M Christensen's theory of 'disruption' has been debunked. Can we all move on now, please?

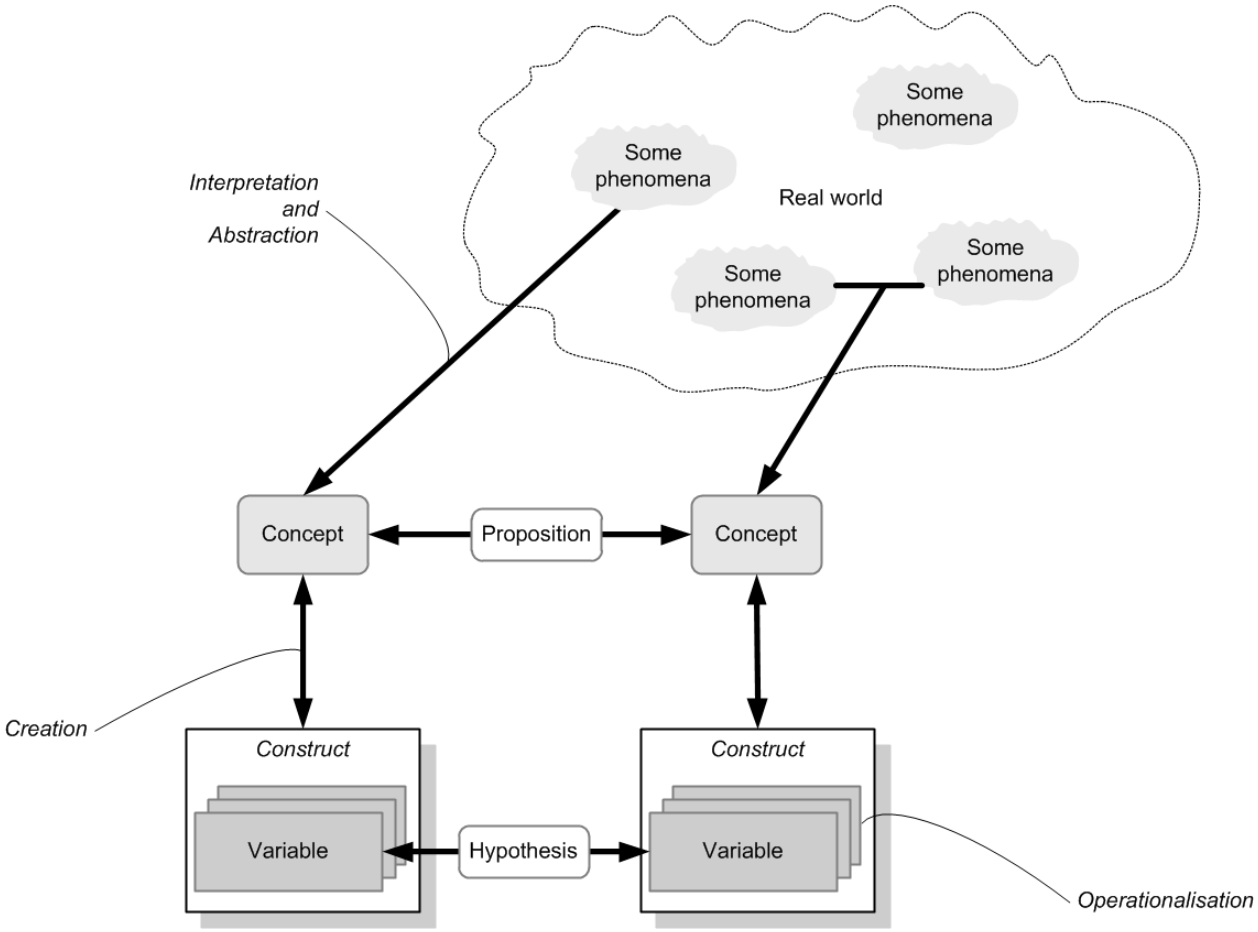
Business guru Clayton M Christensen's big idea of 'disruptive innovation' has been distorted out of all recognition

London taxi drivers protest against the 'disruptive innovation' of Uber last month. Photograph: Peter Macdiarmid/Getty Images

One of the sacred texts of the tech industry is *The Innovator's Dilemma* by Clayton M Christensen. The key to its seductive appeal lies in the subtitle: "When new technologies cause great firms to fail." The book was first published in 1997 and was based on a set of case studies that, Christensen argued, showed that once-successful companies went under not because their managers made bad decisions, but because they kept making the same kind of

Research Questions

Relevant research terminology



Basic Notions

- Conceptualization
  - Is the mental process by which fuzzy and imprecise concepts are their constituent components are defined in precise terms.
    - E.g., what does prejudice actually mean to you? Are there different kinds of prejudice (e.g. race, gender, age, religion)?
  - Important process in the social sciences because of the imprecision and ambiguity of many concepts
    - What is satisfaction?
    - What is empathy?
    - Is there a difference between empathy and compassion?

Basic Notions

- Concept
  - describes an abstract or general idea inferred or derived from specific instances that we perceive in the real world. Concepts are thus mental representations that we develop, typically based on experience.
  - can be of real phenomena (dogs, clouds, pain) as well as of some latent phenomena that we can agree upon (truth, beauty, prejudice, usefulness, value, and so forth).
  - give us a vocabulary to reason about some real-world phenomena and a means to ascribe characteristics or properties to those phenomena and their relationships.
  - can be linked to one another via propositions

Basic Notions

- Propositions
  - link concepts to one another
  - suggested tentative or conjectured relationships between two or more concepts that are stated in a declarative manner
  - Typically linked via some justificatory mechanism → then we are talking theorizing!

What are Research Questions

- *I believe that the choice of research problem – choosing the phenomena we wish to explain or predict – is the most important decision we make as a researcher. We can learn research method. Albeit with greater difficulty, we can also learn theory-building skills. With some tutoring and experience, we can also learn to carve out large numbers of problems that we might research. Unfortunately, teasing out deep, substantive research problems is another matter. It remains a dark art.*

Ron Weber, former EIC MIS Quarterly (2003)

Research questions
- Common Problems

- The “**elevator speech**” problem: You cannot tell me which question you are asking unless you engage in a 5-min monologue. At that time I will have left the elevator.

Research questions
- Common Problems

- The “**so what**” problem: You have a research question, but it simply doesn’t matter to anyone. Research in an applied discipline such as information systems “apply” knowledge to practical problems (for instance, how new technology shapes the work practices of employees).

Research questions
- Common Problems

- The “**solving-the-world**” problem: Your research question is indeed important. But it simply cannot be answered given the resource constraints – it’s basically only you, and/or the time constraints – you have around 2–3 years, depending on the regulations prescribed by your institution, and typically you don’t know enough yet to find the solution quickly.

Research questions
- Common Problems

- The “**insolvability**” problem: Your question simply cannot be answered meaningfully. Sometimes this is because of a logical problem in the question, because the information needed to answer the question cannot be logically or legally obtained, or because the answer is so hard to obtain that feasibility of the research within the constraints is not possible.

Research questions
- Common Problems

- The “**multitude**” problem: You are simply asking too many questions. In turn, most of your questions are too narrow, too irrelevant, too grand, or otherwise deficient. I always tell my students that a good study sets out to answer one question. Maybe two. Nothing is gained by setting out to answer six questions.

Research questions
- Types of “improper” research questions

- **Obvious** questions: “Are there challenges in using information technology?”
  - Of course there are. Obvious questions have answers to which everyone would agree.
- **Irrelevant** questions: “What is the influence of weather on the salaries of technology professionals?”
  - There is no reason to believe that there is any influence whatsoever.
- **Absurd** questions: “Is the earth flat after all?”
  - Absurd questions have answers to which everyone would disagree.
- **Definitional** questions: “Is technology conflict characterized by disagreement?”
  - That is simply a matter of creating a concept that says it does. Definition is a mere form of description, not research.
- **Affirmation** questions: “Can a decision-support tool be developed to facilitate decision-making for senior retail executives?”
  - I sure hope so. There is no reason to believe that it cannot be done.

Research questions
- Important elements

- Asking a research question is the logical, necessary, and inevitable conclusion to a set of arguments.

- These arguments stress that there is
  - an **important problem domain** with
  - an **important phenomenon** that deserves attention from the research community and that relates to
  - an **important problem** with the available knowledge about this type of phenomenon.

Example

- Organizations invest heavily in new information technology, seeking benefits from these investments.
- Many of these benefits never materialize because employees do not use the technologies.
- The literature to date has only studied why individuals accept new technologies but not explicitly why individuals reject technologies. This is a problem.
- Therefore: “Why do people reject new information technology?”

Centefelli RT, *Schwarz* A (2011) **Identifying and testing the inhibitors of technology usage intentions**. Inf Syst Res 22(4):808---823.

Motivating a Research Question:
- The Gap vs the Hook

- The Gap is usually the argument that something **hasn't been done** yet.
  - This is weak because some things shouldn't be done.

- The Hook is a strategy to find a **problem** that **someone** cares about
  - Can be academic, theoretical, practical…

Grant, A.M., and Pollock, T.G. "Publishing in AMJ—Part 3: Setting the Hook " *Academy of Management Journal (54:5) 2011, pp 873-879.*

Good Hook versus Bad Gap

- Bad Gap:
  - “nobody has studied…”
  - “the literature is silent on…”

- Good Gap = Problem:
  - Resolve a contradiction in the literature
  - Extending the literature to account for specific, important phenomena / understandings / contexts (and why)
  - Solve a puzzle for practice that is important but not addressed by the literature
  - Show how existing literature may mislead our thinking
  - Challenge assumptions we take for granted and develop alternatives.
- Remember: You are part of a conversation in the field

Gap-Spotting versus Problematization

- Example for gap-spotting:
  - As the Covid-19 pandemic spread across the globe in 2020, at the beginning we had very little knowledge about the virus, its infection rates, and its possible cures or vaccinations. The problem was a **gap of knowledge**.

Table 1. Basic modes of gap-spotting and their specific versions

Basic gap-spotting modes	Specific versions of basic gap-spotting modes	Reviewed journal articles
Confusion spotting	Competing explanations	Anderson and Reeb (2004; *ASQ* 49(2): 209–37), Burnes (2004; *JMS* 41(6): 977–1002), Gibbons (2004; *ASQ* 49(2): 238–62) Queen (2005; *ASQ* 50(4): 610–41), Schneper and Gullien (2004; *ASQ* 49(2): 263–95), Thomson and Walsham (2004; *JMS*, 41(5): 726–47).
Neglect spotting	Overlooked area	Arend (2004; *JMS* 41(6): 1003–27), Brown (2004; *OS* 25(1): 95–112), Chreim (2005; *JMS* 42(3): 595–623), Davenport and Leitch (2005; *OS* 26(11): 1603–23), Ezzamel (2004; *ORG* 11(4): 497–537), Hannan et al. (2003; *ASQ* 48(3): 399–432), Jensen (2003; *ASQ* 48(3): 466–97), Korczynski (2005; *JMS* 41(4): 575–99), Marchington and Vincent (2004; *JMS* 41(6): 1029–56), Meriläinen et al. (2004; *ORG* 11(4): 539–64), Mueller et al. (2004; *OS* 25(1): 75–93), Musson and Tietze (2004; *JMS* 41(8): 1301–23) Nicolai (2004; *JMS* 41(6): 951–76), Ogbonna and Wilkinson (2003; *JMS* 40(5): 1151–78), Sidhu et al. (2004; *JMS* 41(6): 914–32), Sims (2005; *OS* 26(11): 1625–40), Sparrowe and Liden (2005; *ASQ* 50(4): 505–35), Vaara et al. (2005; *JMS* 42(3): 572–93), Zarraga and Bonache (2005; *OS* 26(5): 661–81).
	Under-researched	Balogun and Johnson (2005; *OS* 26(11): 1573–1601), Baum et al. (2005; *ASQ* 50(4): 536–75), Brickson (2005; *ASQ* 50(4): 576–09), Case and Phillipson (2004; *ORG* 11(4): 473–95), Chan (2005; *JMS* 42(3): 625–72), Corley and Goia (2004; *ASQ* 49(2): 173–08), Javidan and Carl (2004; *JMS* 41(4): 665–91), Munir and Phillips (2005; *OS* 26(11): 1665–87), Symon (2005; *OS* 26(11): 1641–63), Tsui-Auch (2004; *JMS* 41(4): 693–23), Westphal and Khanna (2003; *ASQ* 48(3): 361–98), van Breugel et al. (2005; *JMS* 42(3): 539–66).
	Lack of empirical	Dyck et al. (2005; *JMS* 42/2: 387–16)

Sandberg, J., & Alvesson, M. (2011). Ways of Constructing Research Questions: Gap-spotting or Problematization? Organization, 18(1), 23-44.

Gap-Spotting versus Problematization

FIGURE 1
The Problematization Methodology and Its Key Elements

Aim of the problematization methodology
Generating novel research questions through a dialectical interrogation of one's own familiar position, other stances, and the literature domain targeted for assumption challenging

A typology of assumptions open for problematization				
In-house: Assumptions that exist within a specific school of thought	*Root metaphor:* Broader images of a particular subject matter underlying existing literature	*Paradigm:* Ontological, epistemological, and methodological assumptions underlying existing literature	*Ideology:* Political-, moral-, and gender-related assumptions underlying existing literature	*Field:* Assumptions about a specific subject matter that are shared across different theoretical schools

Principles for identifying and challenging assumptions					
1. Identify a domain of literature: What main bodies of literature and key texts make up the domain?	*2. Identify and articulate assumptions:* What major assumptions underlie the literature within the identified domain?	*3. Evaluate articulated assumptions:* Are the identified assumptions worthy to be challenged?	*4. Develop alternative assumptions:* What alternative assumptions can be developed?	*5. Relate assumptions to audience:* What major audiences hold the challenged assumptions?	*6. Evaluate alternative assumptions:* Are the alternative assumptions likely to generate a theory that will be regarded as interesting by the audiences targeted?

- A "gap" in knowledge is a typical problem with the available knowledge, but it is not necessarily the best or only problem.
- Other problems are
  - Inconsistent observations
  - Competing theoretical explanations
  - Outdated or false assumptions

Alvesson, M., and Sandberg, J. "Generating Research Questions Through Problematization," *Academy of Management Review (36:2) 2011, pp 247-271.*

Specification of a research question

- Research questions are typically one of two types based on the issues they address:

1. “What,” “who,” and “where” questions tend to focus on issues we seek to explore or describe because little knowledge exists about them.

2. “How” and “why” questions are explanatory as they seek to answer questions about the causal mechanisms that are at work in a particular phenomenon.

Type-1 questions

- Type 1 questions seek to learn what the situation of a phenomenon looks like. We ask these questions about phenomena that are new to the world.

- Example:

- *At the onset of the Covid-19 pandemic, the world realised that there was a new virus. The first step was then to find out everything about it: what it looks like, what it does, what its genetic structure is, where it occurs, who can be infected by it, and so forth.*

Type-2 questions

- Type 2 questions seek to explain the cause and effect mechanisms behind why and how something works.

- Example:
- *we wanted to find out how the Covid- 19 virus infects people so we could devise treatments and vaccinations that hinder the mechanism by which the virus infects people.*

- Type 2 questions often temporally succeed type 1 questions as it is difficult to explain a phenomenon without first systematically exploring and describing it.

Principles to reflect on why a RQ is justified:

- **Feasible**: Adequate subjects of study are available, technical expertise is available, time and money are available, and the scope is manageable.
- **Interesting**: You are confident that you can maintain an interest in the topic and maintain your own motivation to study it for several years. If you are not interested in pursuing the answer to the question, no one will be interested in hearing about the results.
- **Novel**: An answer to the question will confirm or refute previous findings or provide new findings.
- **Ethical**: Pursuing and answering the question will not violate ethical principles for the conduct of research, and will not put the safety of the investigators or subjects at risk.
- **Relevant**: both the question and the future answer(s) are important in the sense that they inform scientific knowledge, industry practice, and future research directions.

End of Chapter 2