So what are we really doing in BPM Research?

Jan Mendling
My History Log

Andernach

Uni Antwerp

Uni Trier

WU Wien

HU Berlin

QUT Brisbane
WU Campus Key Facts

- 100,000 m²
- 22,400 Students
- 4,500 Work places
- 90 Lecture Halls and Rooms
- 6 Internationale Architects
Institute for Information Business

Process Management:
- Process Modeling
- Process Mining
- Process Architecture
- Sensory Event Data
- Natural Language Processing

Data Management
- Semantic Web
- Ontology Languages
- Linked Data
- Open Data
- Web Databases and Query Languages

Knowledge Management
- Vision Development
- Analysis of Needs
- Theory of Learning
- Organizational Learning
- Knowledge Creation and Learning in Systems
What we do in BPM Research
“To take an example, the trade of a pin-maker: But in the way in which this business is now carried on, it is divided into a number of branches:

- One man draws out the wire; another straights it;
- a third cuts it; a fourth points it; a fifth grinds it at the top for receiving the head; to make the head requires three operations; to put it on is a peculiar business;
- to whiten the pins is another; to put them into the paper; and the important business of making a pin is, in this manner, divided into about eighteen distinct operations.”
Division of Labour

Icons designed by Freepik
Process Model Comprehension

Subjects

Model

Task  ->  Outcome

Independent variables  ->  dependent variables
(factors with treatment)  (response variables)

Technique

Theory

Observation
Process Model Similarity and Matching

Leopold et al. 2014
Process Mining RFID Data

ARISING DATA SOURCES

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Schönig et al. 2015
The State of the Art of Business Process Management Research

Recker/Mendling, BISE 2016
So what are we really doing in BPM Research?
Discussion on State of the Field

Formalisms

Design

Behaviour

Haifa, Israel

BPM 2014
“The paper investigates the evolution of business processes across organizational boundaries. It does so conducting an empirical study based on 3 cases in different industries and evaluating the results.

The paper uses terminology of IS and management science different from the one I used in this summary.

[...]

Weaknesses:

No hard results. Sample size has no statistical validity.

No real novel results. Very expected. No big contribution.

Confusing terminology. The key term Business Process Management is only explained on page 3.”
“As I noted previously, my background and interest in papers that describe the implementation of some software tool is limited. In my view a research paper needs to demonstrate methodological rigor and make a significant theoretical contribution. […]

Regarding other ways of demonstrating significant contribution: an “an implemented proof-of-concept software artifact that demonstrates the feasibility of our approach” in my view is simply not enough – you can somewhat demonstrate that your implementation works in that case of the US organization that you consider. There is no way you can currently demonstrate that it would be feasible – let alone successful or otherwise creating impact elsewhere; you simply have not done a study of such consequences.”
Fabrications of such Review Processes

A reviewer:
„The methodology is based on Hevner et al. (2004) and, hence, follows the design science research paradigm. However, only this one source is cited in the context of the discussion of research methodology. This ignores on the one hand, that Hevner himself has published updates and elaborations of his methodology after 2004 (such as the book by Hevner and Chatterjee: Design Research in Information Systems, Springer, 2010). On the other hand, there is literature that provides more specific and generally accepted phase models how to conduct DSR, such as Peffers, K., Tuunanen, T., Rothenberger, M.A. and Chatterjee, S.(2007). 'A design science research methodology for information systems research.' Journal of Management Information Systems 24(3), pp. 45-77.”

…but who writes as review for a survey study:

- **Bold italic terms replaced**

  „The methodology is based on Popper’s critical rationalism, hence, follows the empirical science research paradigm. However, only this one source is cited in the context of the discussion of research methodology. This ignores on the one hand, that Popper himself has published updates and elaborations of his methodology after 1984 (such as Conjectures and refutations. Prometheus. Introductory Readings in the Philosophy of Science (1998)). On the other hand, there is literature that provides more specific and generally accepted phase models how to conduct scientific research, such as Gauch: Scientific method in practice (2003).”
„Reviewers feel that something is not good, but they are not able to express it“ (Ron Weber, as communicated by Jan Recker)
How to clarify BPM research?
What Dijkstra Advises

Whenever you are developing something new, you have tasks. You have to create a new **subject matter**. You have to create a **language** which is appropriate to discuss the subject matter. Many people are insufficiently aware of that second obligation.

Shasha/Lazere 1998
Science as a process of induction and deduction

hypothesis (conjecture, model, theory)

induction

deduction

induction

deduction

induction

deduction

induction

deduction

induction

deduction

... ...

data (facts phenomena)

Box et al. 1978
Design Science: What is the Claim?

Gregor, Hevner 2013
Algorithm Engineering: Hypotheses and Falsification

Sanders 2009
That is, an engineering theory claims that for any state of the world $x$, including an artefact $a$, where acceptable environmental conditions $E$ apply in the world and to the artefact, and where the artefact fits a design $D$, then requirements $R$ will be satisfied. When applied to reason about a specific artefact, the requirements for the artefact must be within the theory’s predicted performance of the artefact $R$, and the actually-acceptable limitations on the specific operating environment must contain the theory’s environmental conditions $E$. Designs are usually abstractions, often expressed in a form that is consistent with relevant analytical theories. Multiple artefacts may satisfy a single design, and a single artefact may satisfy many designs.
A system to do the process specified, by developing models of that assumed to exist, in the specified form of representation, based on necessary information, gained from particular sources, in order to assist users achieve specified purposes.

A root definition of a generalised management science methodology

This root definition makes explicit the three types of modelling assumptions as described above. They are identified by the different forms of underlining:

**Ontology:** that assumed to exist—for example, real measurable objects, or conceptual systems, or causal relations.

**Epistemology:** form of representation—for example, equations, diagrams, software; necessary information—for example, quantities, measurements, meanings, beliefs; source of information—for example, real-world objects, participants, groups.

**Axiology:** users—for example, analyst, facilitator, participant, stakeholder; purpose for example, optimising, learning, experimenting, challenging.
So how to frame BPM research?
Regression to Regression

\[ E(bp) + D(bp) + B(bp) + \varepsilon = Q(bp) \]

BP Behaviour Science

BP Logics

BP Design Science

BP Management Practice