Three Research Perspectives on Business Process Management

Jan Mendling
My Curriculum Vitae

Uni Antwerpen

Uni Trier

WU Wien

HU Berlin

QUT Brisbane
Division of Labour

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.

Smith 1776
Task efficiency
“It follows that the most important object of both the workmen and the management should be the training and development of each individual in the establishment, so that he can do (at his fastest pace and with the maximum of efficiency) the highest class of work for which his natural abilities fit him.” (Frederick W. Taylor 1911)

Coordination efficiency
“The question in view of this overall thinking is how to divide the tasks of a company other than by natural technical process phases?” (Nordsieck 1972)

Flow-Time Efficiency of Business Processes in Practice (Blackburn 1992) (Minimal Working Time / Working Time + Waiting Time)
- Auto manufacturing 5.60%
- Hospital 3.75%
- Commercial bank 2.36%
- Consumer packaging 0.14%
- Life insurance 0.16%
BPM Lifecycle

1. Process identification
   - Process architecture
   - Conformance and performance insights
   - As-is process model
   - Insights on weaknesses and their impact

2. Process discovery
   - Executable process model
   - To-be process model

3. Process monitoring and controlling
   - Process implementation

4. Process analysis
   - Process redesign

Dumas et al. 2013
Discussion on State of the Field

Formalisms

Behaviour

Design
Discussion on State of the Field

Formalisms

mathematical formulae, algorithms, lemmata, logical proofs

Behaviour

Design
Formal Properties of Behaviour Profile

- **Strict Order** between \( C \) and \( D \)
- **Exclusiveness** between \( E \) and \( G \)
- **Interleaving** between \( B \) and \( C \)

Computable in \( O(n^3) \) for Free Choice nets

Weidlich et al. 2011
Discussion on State of the Field

Formalisms

Behaviour

socio-technical phenomena grounded in social, psychological or cognitive theory. Hypotheses deducted and tested using forms of empirical inquiry.
BPM Adoption and Organizational Culture

Organizational culture

- F: Organizational Culture Type
- O: OCAI Clan Score, OCAI Adhocracy Score, OCAI Market Score, OCAI Hierarchy Score

BPM adoption success

- F: Business Process Orientation
- O: BPO Maturity Model Score
- F: Process Performance
- O: PPI Score

Hribar, Mendling 2014
Discussion on State of the Field

New ways of solving socio-technical problems, formulating means-ends relationship, application demonstrated in order to support that certain end is achieved in a better way.
Set up incorporates identification of installation requirements and the creation of the specification document. In case support agreements are also negotiated, the key-account manager is involved.
Design and Behaviour

Environment
- People
  - Roles
  - Capabilities
  - Characteristics
- Organizations
  - Strategies
  - Structure & Culture
  - Processes
- Technology
  - Infrastructure
  - Applications
  - Communications
  - Architecture
  - Development Capabilities

Information Systems Research
- Develop/Build
  - Theories
  - Artifacts
- Justify/Evaluate
  - Analytical
  - Case Study
  - Experimental
  - Field Study
  - Simulation

Knowledge Base
- Foundations
  - Theories
  - Frameworks
  - Instruments
  - Constructs
  - Models
  - Methods
  - Instantiations
- Methodologies
  - Data Analysis Techniques
  - Formalisms
  - Measures
  - Validation Criteria

Relevance
Rigor

Business Needs
Assess
Refine

Application in the Appropriate Environment
Additions to the Knowledge Base

Hevner et al. 2004
Method Classification Study

- Focus and intent
- Core research components
- Research method
- BPM lifecycle
- Empirical evidence
- Impact

BPM 2003-2013
## Profile of the BPM Conference

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- Share of papers with < 10 citations: 25% 45% 38% 69% 33% 35%
- Share of papers with => 10 and <= 100 citations: 60% 50% 58% 23% 50% 57%
- Share of papers with => 100 citations: 14% 5% 4% 8% 17% 8%
Formalisms

Formal Science
well established and
well understood
Findings on State of the Field

1. Adopt Standards for Experiments from Empirical Software Engineering

Behaviour
What is Causality?

A $\rightarrow$ B
Where is potential causality in business process modeling?

1. What is a desirable outcome?
2. What is a potentially strong factor?

Factors -> Measures
Why is there Causality?

- Theoretical Foundation in
  - Cognitive Psychology
  - Social Psychology
  - Game Theory

- Perfect Pitch:
  - Theory has not been validated in specific context
  - Contradicting empirical evidence
  - Contradicting theories
Theory and Observation

Theory:

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

Observation:

Subjects

Model

Technique

Task -> Outcome

Fig. 2 Norman’s [28] theory of action as applied to IS modeling.
Experimental Process

- Experiment Definition
  - Experiment Planning
    - Experiment Operation
      - Analysis & Interpretation
      - Presentation & Package

Wohlin et al 2000
2. Adopt Standards for Surveys from Information Sys. Research
Survey Design Methods

Conceptualization
- Develop a Conceptual Definition of the Construct
  - Step 1

Development of Measures
- Generate Items to Represent the Construct
  - Step 2
- Assess the Content Validity of the Item
  - Step 3

Model Specification
- Formally Specify the Measurement Model
  - Step 4

Survey Instrument Design
- Formally Design the Survey Instrument
  - Step 5

Scale Evaluation and Refinement
- Collect Data to Conduct Pre-test
  - Step 6
- Scale Purification and Refinement
  - Step 7

Validation
- Gather Data from New Sample & Reexamine Scale Properties
  - Step 8
- Assess Scale Validity
  - Step 9
- Cross-Validate the Scale
  - Step 10

Norm Development
- Develop Norms for the Scale
  - Step 11

Discussed in Chapter 5

Discussed in Chapter 6

Not within scope of this thesis

Lange 2013, adopted from MacKenzie et al. 2011
Validity and Reliability

- Reliable
  - Not valid
- Valid
  - Not reliable
- Not reliable
  - Not valid
- Reliable
  - Valid

http://www.studyblue.com/notes(note/n/434-lecture-14/deck/2900434
Reflective versus Formative

Baumann, Elliott, Hamin 2011
3. Adopt Standards for Theory-building and Qualitative Research from Information Sys. Research and Empirical Software Engineering
A -> B

1. Correlation
2. Precedence
3. Explanation
Theory and Observation

Subjects

Model

Task    ->    Outcome

Technique

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

Theory

Observation

Fig. 2 Norman’s [28] theory of action as applied to IS modeling.
Inductive Theory Building

- Grounded Theory
- Think Aloud
- Observation
Findings on State of the Field

4. Build Research on established Standards for Literature Reviews
Figure 3-4 Breakdown of Literature Identified in Literature Review

- Database search: 868
- AIS basket search: 4
- Total: 872
- Redundant publication: 190
- Non-peer review: 82
- Other topic: 453
- Sub-total: 147
- Not relevant: 99
- Relevant: 48

Lange 2012 using Webster/Watson 2002
Findings on State of the Field

1. Taxonomy of the Field is needed
BPM Use Cases
Findings on State of the Field

2. Consider Methods like Action Research and Case Studies according to established standards
Case Study Research

Positivist (Yin)
- Validation Tool
- Propositions tested

Interpretative (Eisenhardt)
- Theory Building
- Propositions derived
Findings on State of the Field

3. Evaluate with Design Hypotheses and Benchmark Data
Evaluation

- Justify Sample Data
- Formulate Hypotheses on Expected Benefit
- Run with new and old approaches
- Discuss Generalizability
General Research Directions

- Share Tools and Data
- Adopt Reporting Standards
- Use Empirical Methods
- Taxonomize the Field
- Study Perspectives beyond Control Flow