Theory Building

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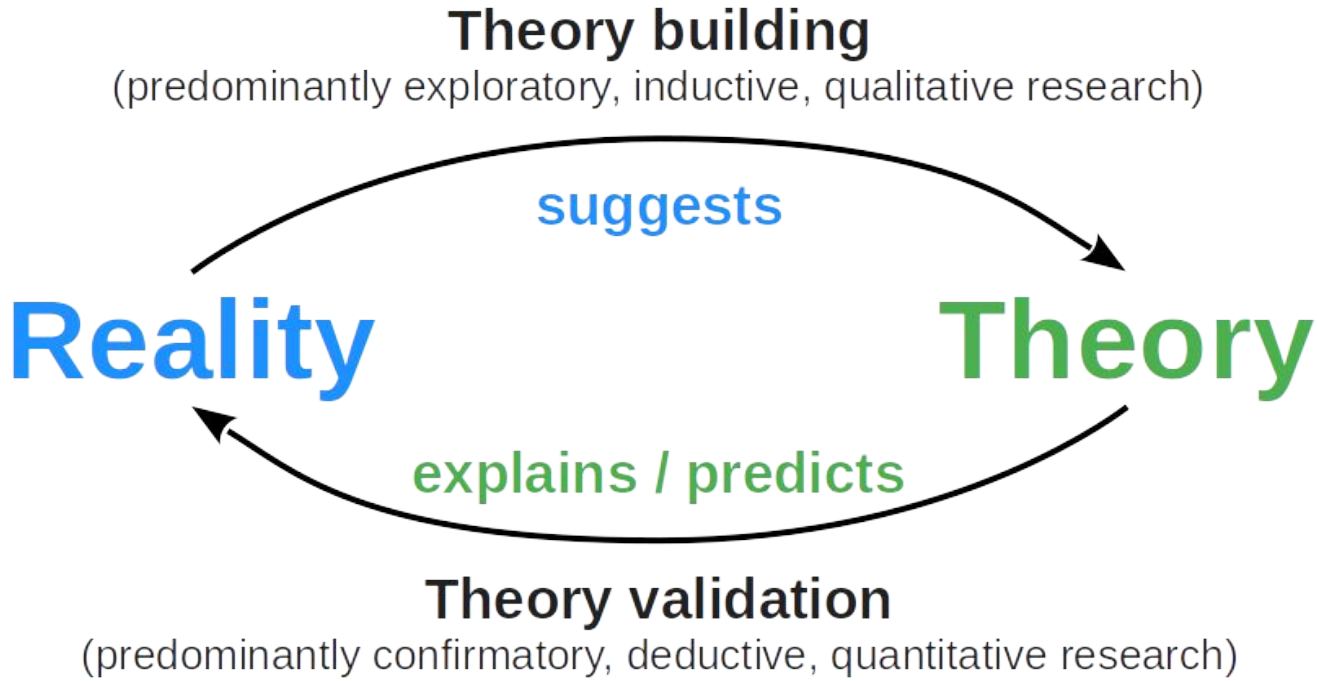
Agenda

1. Theory building
2. Qualitative research
3. Example methodologies
4. Multi-method research
5. Mixed-methods research
6. Quality assurance

1. Theory Building

The Logic and Process of Science (Recap)



Purpose of Theory Building

The purpose of scientific theory building is to

- Create, revise, and build out a theory that
  - Correctly explains and/or predicts reality
  - Can can be continuously tested
  - All in a cost-efficient way

Theory Building Research

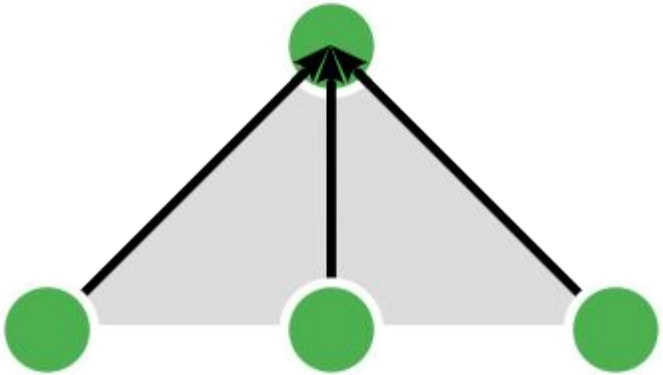
Theory building research is

- Exploratory
- Inductive
- Qualitative

Inductive Reasoning

Inductive research is based on **inductive reasoning** which is

- Abstracting from data by recognizing patterns and drawing conclusions



Theory Building Process

The **theory building process**

- Is iterative
- Is incremental
- Mitigates risk
- Never ends

2. Qualitative Research

Base Terminology (Recap)

Researchers use a research methodology

- Recap: A start-to-finish framework for how to perform theory building

To create a research design

- Recap: A process description of how to answer a research question

That utilizes research methods

- Recap: A method of how to answer a type of research question

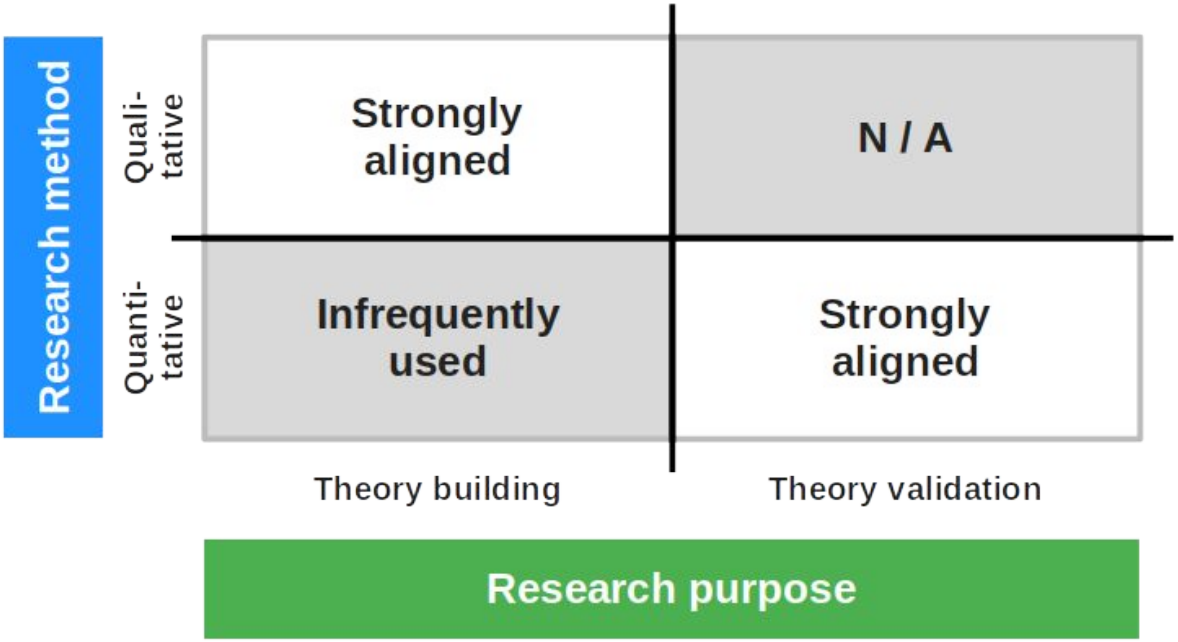
Which are based on research practices

- Recap: A way of doing something with a defined outcome

What Makes a Research Design a Qualitative Design?

1. The **theory building** purpose
2. The use of **theoretical sampling** in data collection
3. The acquisition and use of **qualitative data**

Qualitative vs. Quantitative Research Methods (Recap)

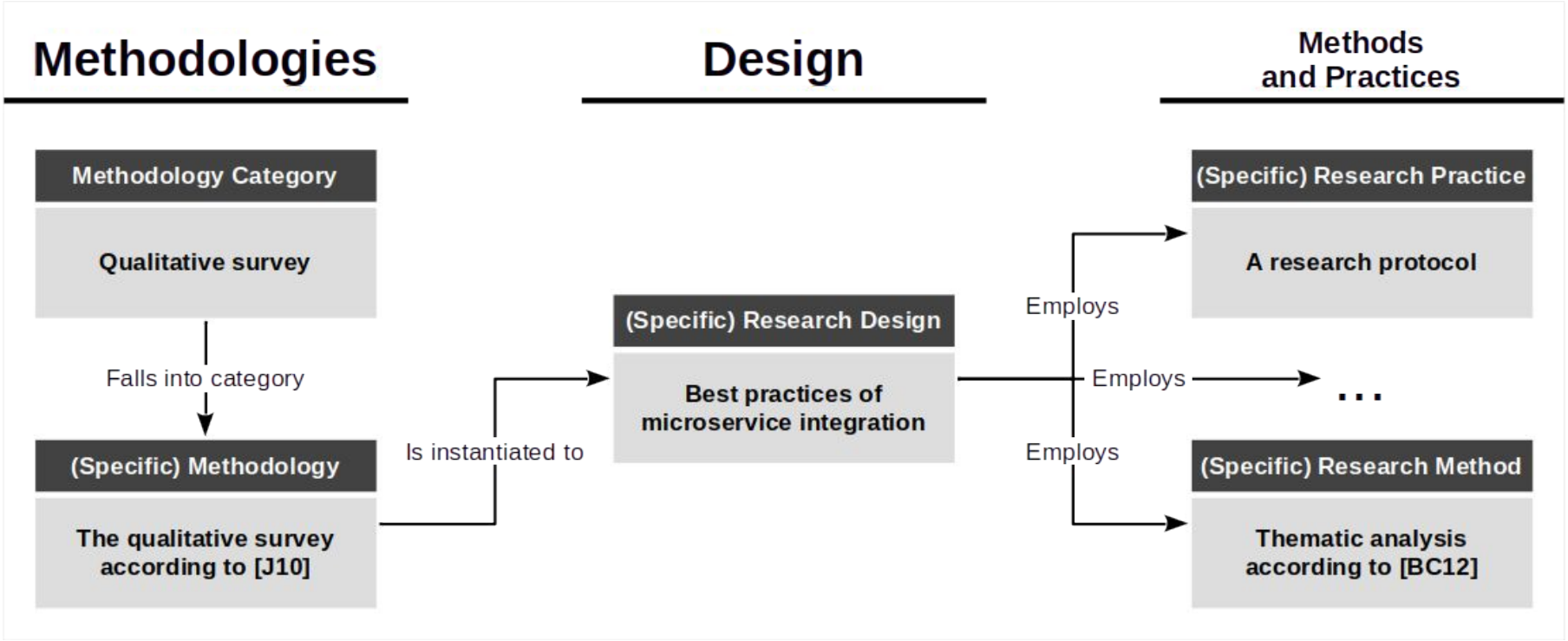


Example Qualitative Research Methodology (Recap)

The **qualitative survey** according to Jansen (2010)

1. Write research protocol
2. Build sampling model
3. Sample for theory building
4. Perform interviews
5. Analyze transcriptions
6. Determine saturation
7. Iterate or conclude

Example Research Design and Its Context



3. Example Methodologies

Research Methodologies

Main categories

- Literature survey
- Qualitative survey
- Action research
- Case study research
- Design science research
- Grounded theory
- Ethnographies

Not a methodology

- Introspection

Action Research

Action research is a research methodology in which the researcher

- Applies a theory being built to help create a desired outcome
- Evaluates the theory as to its trustworthiness

Participatory action research is action research in which the researcher

- Joins a case (organization) to work side-by-side with practitioners

Action Research Process

1. Identify problem
2. Iterate over action loop
    a. **Plan action**
    b. **Perform action**
    c. **Reflect on action**
3. Specify learning

Example (Specific) Action Research Methodologies

- Action research according to Lewin (1946)
- Participatory action research according to McIntyre (2007)
- Critical participatory action research according to Kemmis et al. (2014)

Case Study Research

Case study research is a research methodology in which the researcher

- Investigates a (contemporary) phenomenon it its original context
- Where the boundaries between phenomenon and context are blurry

Case Study Research Process

1. Plan
2. Perform
    a. **Design** (case selection, units of analysis, propositions, questions, logic, criteria)
    b. **Prepare** (research protocol, ethics approval, conflicts of interest, pilot case)
    c. **Collect** (multiple data sources, case study database, chain of evidence)
    d. **Analyze** (qualitative data analysis, case description, rival explanations)
3. Report

Example (Specific) Case Study Research Methodologies

- Case study research according to Eisenhardt (1989)
- Case study research according to Yin (2017)
- Case study research in software engineering Runeson et al. (2012)

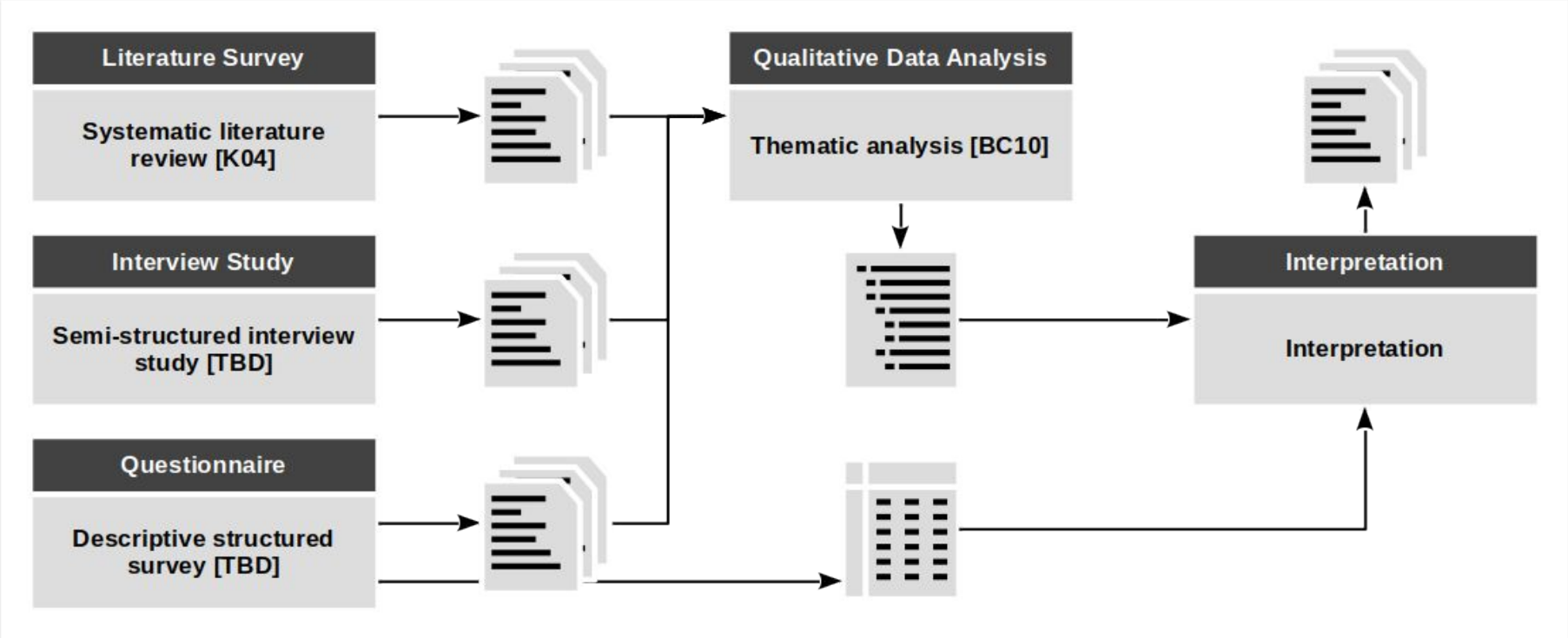
4. Multi-Method Research

Multi-Method Research Designs

A **multi-method research design** is a research design that

- Uses multiple methodologies and methods
- Within either theory building or validation research

Example Problem Identification in Design Science Research



Example Multi-Method Research Design

Microservices integration

1. Qualitative survey [J10] (for the initial theory)
2. Participatory action research [K+13] (for theory build-out)
3. Case study research [Y17] (for theory evaluation)

5. Mixed-Methods Research

Mixed-Methods Research Design

A **mixed-methods research design** is a research design that

- Combines qualitative with quantitative research methods

Example Mixed-Method Research Design

Collaborative data engineering

1. Structured literature review [K04] for problem identification
2. Case study research [RH09] for evaluation and revision
3. Controlled experiment [K+15] for experimental validation

Example Evaluation in Design Science Research

Language efficiency evaluation

1. Controlled experiment [W12]
2. Interview study [J10] for causal analysis

6. Quality Assurance

Quality Criteria for Research Methods [G81] (Recap)

Intuition	Qualitative research	Quantitative research
Truth value	**Credibility**	Internal validity
Applicability	**Transferability**	External validity
Consistency	**Dependability**	Reliability
Neutrality	**Confirmability**	Objectivity

Trustworthiness [LG85]

Credibility is

- The degree of confidence in the truth of the research findings

Transferability is

- The degree to which the research findings can be transferred to another context

Dependability is

- The stability of research findings over time

Confirmability is

- The degree to which the research findings can be confirmed by other researchers

Quality Establishment, Not Assurance

Quality in qualitative research is “established” [LG85]

- Quality is proactively backed into the methods

Practices for Establishing Quality

Credibility

- Prolonged Engagement
- Persistent Observation
- (Different forms of) triangulation
- Peer debriefing
- Negative case analysis
- Referential adequacy
- Member-checking

Transferability

- Thick description

Dependability

- Inquiry audit

Confirmability

- Confirmability audit
- Audit trail
- Triangulation
- Reflexivity

Summary

1. Theory building
2. Qualitative research
3. Example methodologies
4. Multi-method research
5. Mixed-methods research
6. Quality assurance

Thank you! Any questions?

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