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A GUIDING FRAMEWORK FOR DEVELOPING DESIGN METHODS

OUTLINE

- Research problem - recap
- Dissertation outline
  - Research plan
  - Objectives
  - Expected outcomes
- Case study research
- Case studies in design research
- Current status
- Path forward

RESEARCH PROBLEM

✖ design methods/tools from their own **experience and experimentation**

✖do not follow an **apparent systematic method**

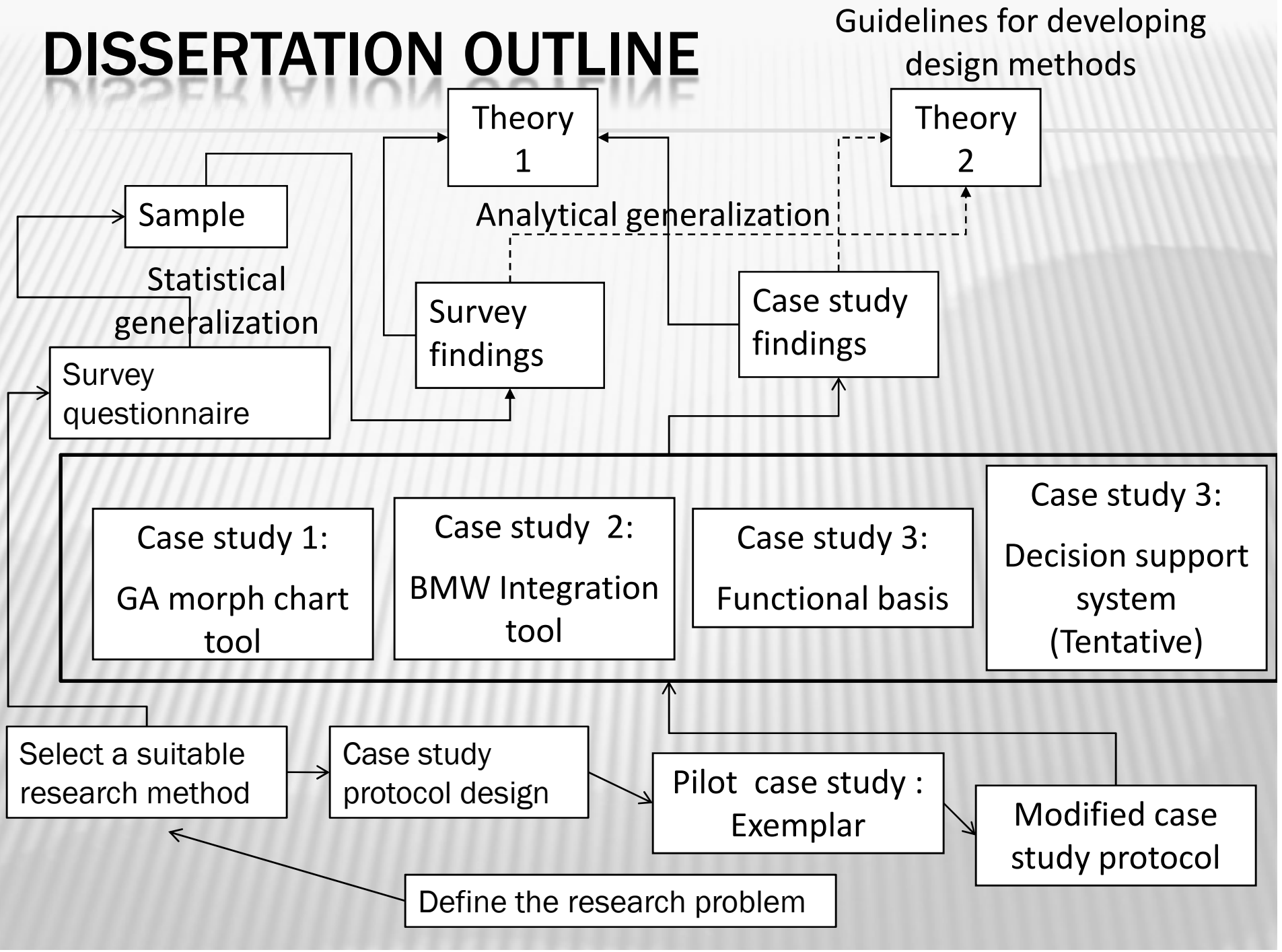
✖ The process remains as a **black box**

✖ **trial and error** longer development times , incomplete and inefficient methods/tools

✖ **little provision for feedback** from the artifact or industry , difficult to make iterations

✖**not documented** in a systematic way, chances of collaboration and knowledge reuse are minimal

DISSERTATION OUTLINE



DISSERTATION OUTLINE

- *Objective*: Develop a framework to guide design method/tool development.
- *Expected outcomes*:
  - Establishment of ‘case study’ as a suitable research method for design.
  - Arrive at a fundamental Theory of method development
  - Develop a method to select concepts at varying level of abstraction and functions (using the developed framework, validation)

A DESIGN RESEARCH METHOD?

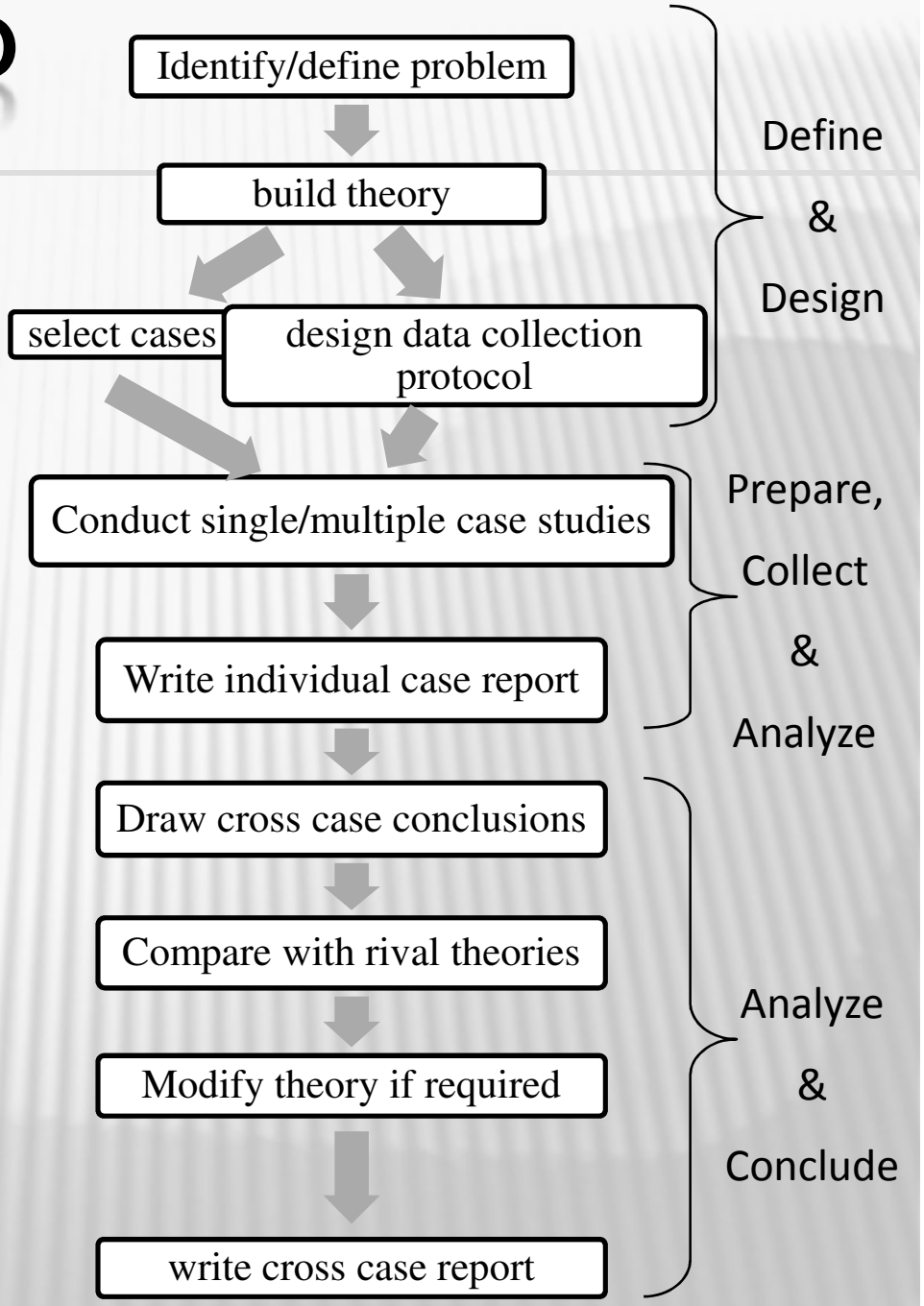
- The sample sizes are statistically invalid.
- Number of variables is greater than data points.
- A design task cannot be appropriately replicated /simulated outside its real life context.
- Intrusion by external factors, including a research method, would affect the design process.
- Direct observation of variables is many times impossible.
- Each case and each participant are different.
- Some of the decisions made by designers, many times based on their intuition, could not be explicitly justified.
- A design task cannot be performed twice without the effect of learning bias.
- Design lacks a firm theory, which makes it difficult to setup a hypothesis.
- Definition of variables is difficult.
- Variables and influences are highly interconnected.

REQUIREMENTS FOR A DESIGN RESEARCH METHOD

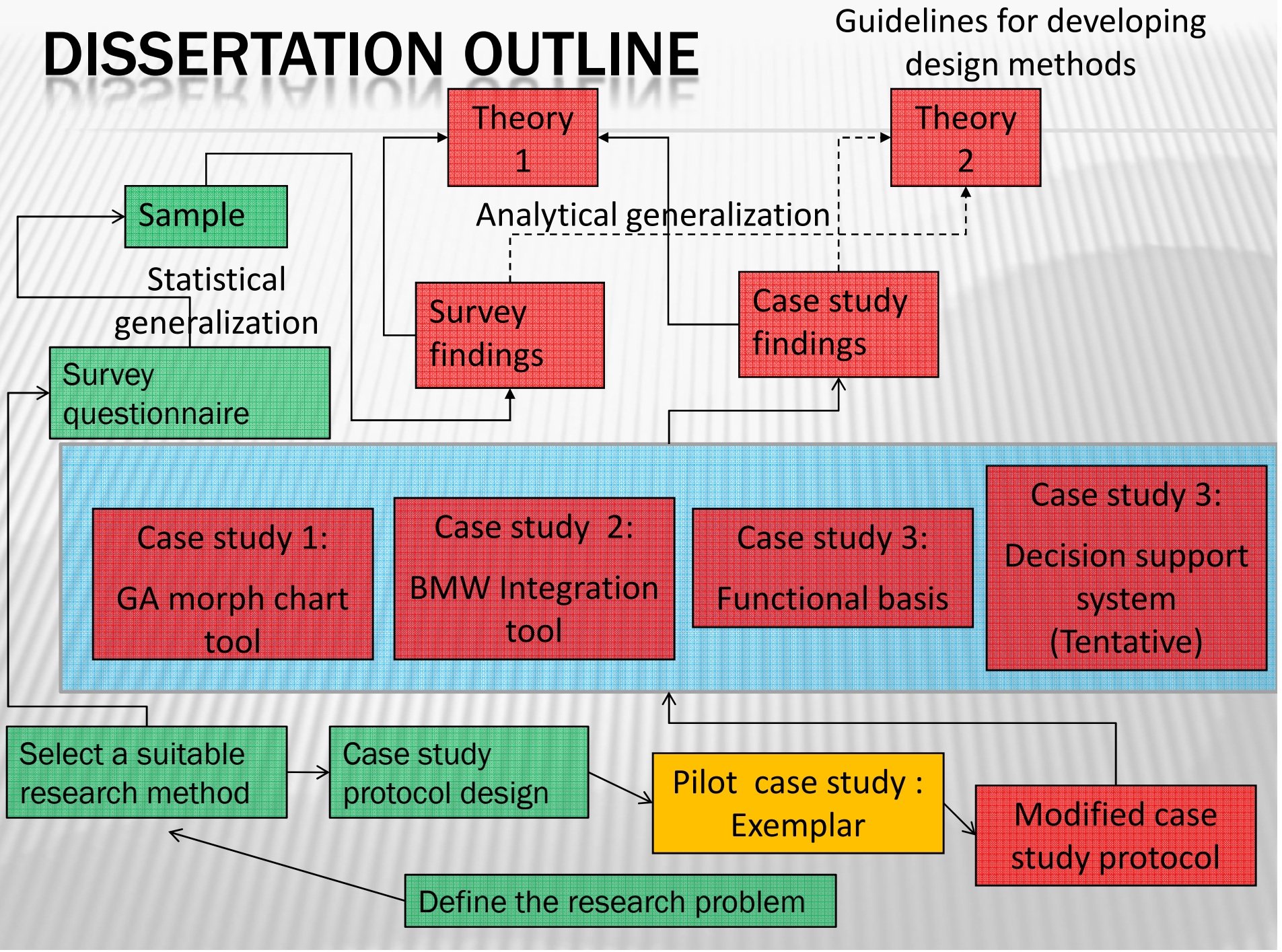
- *Problem definition*
  - Help in defining the problem
  - Help in formulating a hypothesis
  - Help in building theories
  - Help in defining units of analysis
- *Data collection*
  - Be appropriate for statistically invalid sample sizes
  - Work well even when variables are more than data points
  - Aid in collecting data within the context of design
  - Accommodate indirect observation of variables
  - Elicit implicit and explicit data from the subject
  - Be adaptable for both qualitative and quantitative types of data collection
- *Data analysis / Interpretation*
  - Include specific techniques for data analysis and interpretation
  - Help in generalization of study's findings
  - Provide means for validation of findings
- General
  - Be minimally intrusive
  - Work well with variety of cases within the study
  - Work well with variety of participants within a case
  - Facilitate use of multi-method approach

CASE STUDY METHOD

- Empirical, not qualitative or quantitative (can use multi-method)
- Not sample logic; not statistical generalization
- Collect data within context
- Implicit and explicit data
- Has a rigorous procedure, guidelines for data collection, analysis, report
- Non-intrusive
- Most suitable for design research
- *Problem: Selection of cases in design , lack of theory*



DISSERTATION OUTLINE



THANK YOU!

QUESTIONS?

COMMON OBJECTIONS TO CASE STUDIES

How can you generalize based on one case study?

You are biased towards verifying a preconceived notion while doing a case study.

Case study is useful only to form a hypothesis, not for testing it and building theories.

Theoretical knowledge is more valuable than practical knowledge.

It is difficult to summarize and develop theories based on specific case studies.

JUSTIFICATIONS

How can you generalize based on one case study?

- Depends on the **chosen case** and **how it is chosen.**
- Applies as well to **scientific method**
- E.g. Galileo's view of gravity
  - was based on a single case, not large samples
  - was not tested with varying heights, materials, wind conditions etc, but yet widely accepted
- Select a **critical case** (like Galileo)
  - If it is true (or false) for this case, it is generally true (or false) for all other cases too.
- Fits falsification logic type studies
  - All swans are white
- Case studies best suited for finding 'black swans' - in-depth

How can you generalize based on one case study?(contd)

- Finding a critical case is based on intuition and experience
- If cannot find one single critical case use replication logic
- Multiple cases – intention of replication, not sampling
- Similar to replication of experiments
- 1-2 variables could be different between multiple cases, for more compelling conclusions
- If similar conclusions can be drawn from all cases – more generalizable
- Number of cases depends on complexity of subject, difference in rival theories.

Case study is useful only to form a hypothesis, not for testing it and building theories.

- Similar to previous objection
- Strategic selection of case is significant
- Extreme cases
  - obtain information about unusual cases
- Maximum variation case
  - obtain information about various circumstances that affect case process and outcome
- Critical case
  - If it is true (or not) for this case, it is true for all (no) cases
- Paradigmatic case

You are biased towards verifying a preconceived notion while doing a case study.

- Most case studies try to falsify notions rather than proving them
- Allegation 1: qualitative methods are more subjective
  - Subjectivity is inherent in all types of research
  - Most case studies report that preconceived notions are erased
- Allegation 2 : Case studies allow more subjectivity as they lack rigor
  - Case studies have a rigorous procedure (Yin)
  - They provide chance for rigorous analysis of all affecting variables
  - A subjective bias which gets into quantitative method may never get noticed, whereas case study has talk-back

Theoretical knowledge is more valuable than practical knowledge.

- Social and design research does not yet have a predictive theory - context dependent knowledge is important
- Theoretical knowledge - Novice, practical - experts

It is difficult to summarize and develop theories based on specific case studies.

- It is true that summarizing case studies is difficult
- This difficulty is not due to the method of case study research, but due to the nature of reality being studied by the case study