Case Study Research

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NYT D05

Agenda

1. Case study research
2. Case study research design
3. Case study research execution
    a. Case preparation
    b. Data collection
    c. Data analysis
4. Stopping criterion
5. Quality assurance

1. Case Study Research

Case Study Research

A case study is

- An empirical in-depth investigation of
  - A contemporary phenomenon
  - In its real-world context

We use Yin (2009) here

Applicability of Case Study Research

Case study research can cope with situations in which

- The phenomenon under investigation and its context aren’t easily separable
- There will be many more variables of interest than data points

Properties of Case Study Research

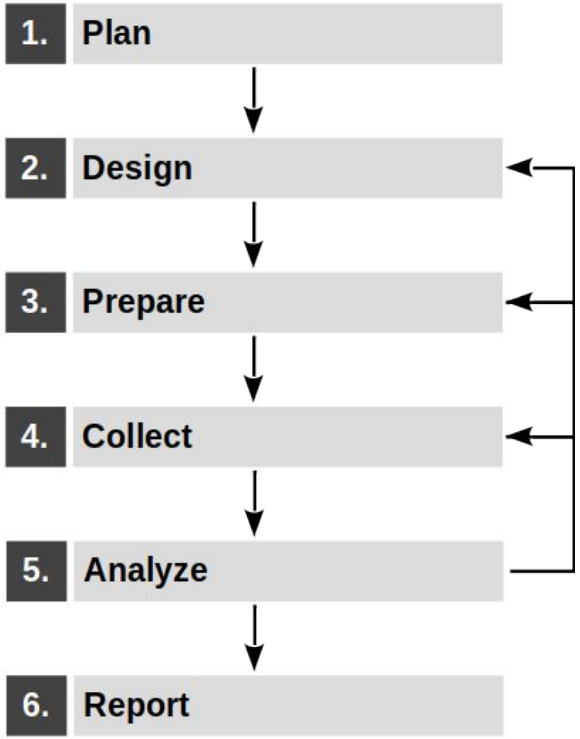
Case study research

- Uses multiple sources of evidence in order to triangulate results
- Benefits from the prior development of theoretical propositions

The Case Study Research Process

Case study research is linear yet iterative

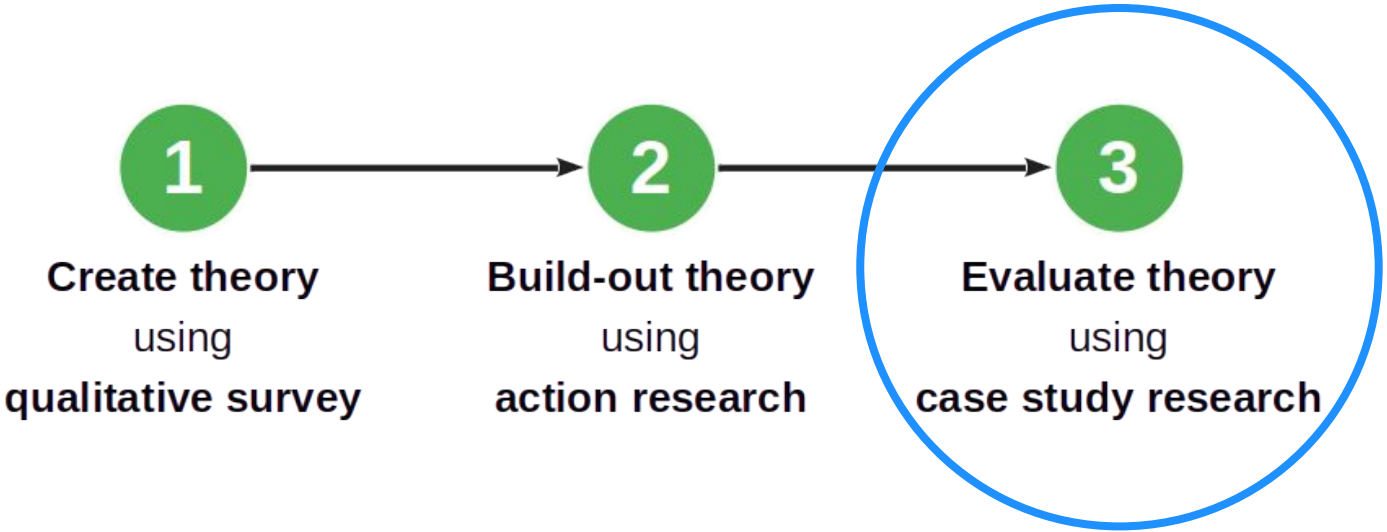
1. **Plan** case study research
2. **Design** research
3. **Prepare** cases
4. **Collect** data
5. **Analyze** data
6. **Report** findings



When to Use Case Study Research [Y09]

	Experiment	Survey	Archival analysis	History	Case study
Form of research question	How, why?	Who, what, how much?		How, why?	How, why?
Requires control of behavioral events	Yes	No	No	No	No
Focuses on contemporary events	Yes	Yes	No	Yes/no	Yes
Studies real-life context	No	No	No	No	Yes
Relies on one source of evidence	Yes/no	Yes	No	No	No

Case Study Research in a Larger Research Design



Exploration vs. Evaluation

Case study research can be used both for

- Exploration
- Evaluation

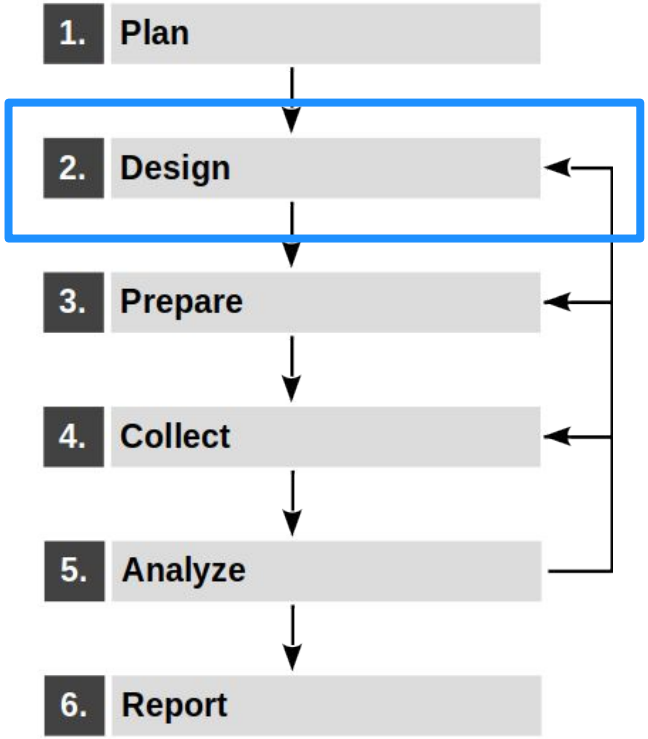
Both are a form of building out your theory

2. Case Study Research Design

Case Study Research Design

Components of a case study research design

1. The research questions
2. The propositions, if any
3. The unit(s) of analysis
4. The data-to-proposition linking logic
5. The interpretation criteria



Example CSR Problems in PLE Research Questions [1]

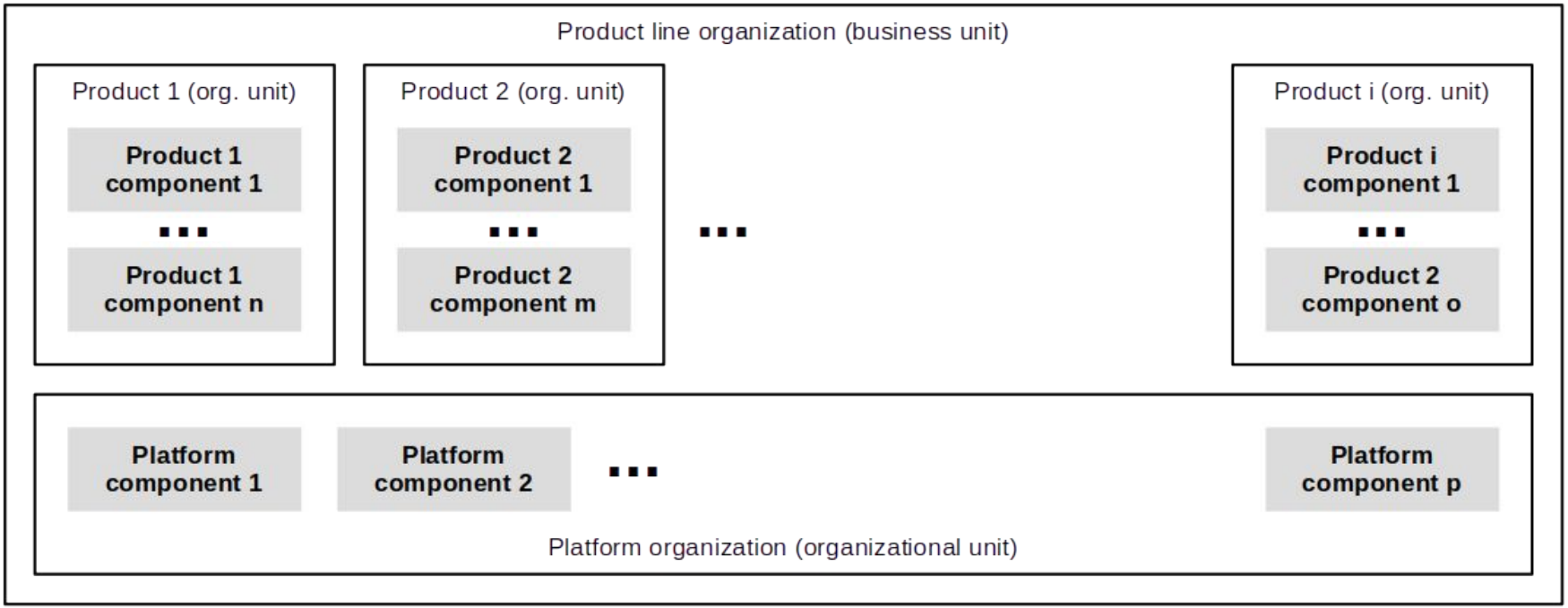
Research question (study question)

- What are current problems in product-line engineering (PLE) and why?

No specific propositions (hypotheses)

[1] Riehle, D., Capraro, M., Kips, D. & Horn, L. (2016). Inner Source in Platform-Based Product Engineering. IEEE Transactions on Software Engineering vol. 42, no. 12, pp. 1162-1177.

Product-Line Engineering



Unit of Analysis

A unit of analysis is

- A construct being analyzed

Units of analysis can be

- Tangible (e.g. people, products)
- Intangible (e.g. theoretical constructs like group dynamics)

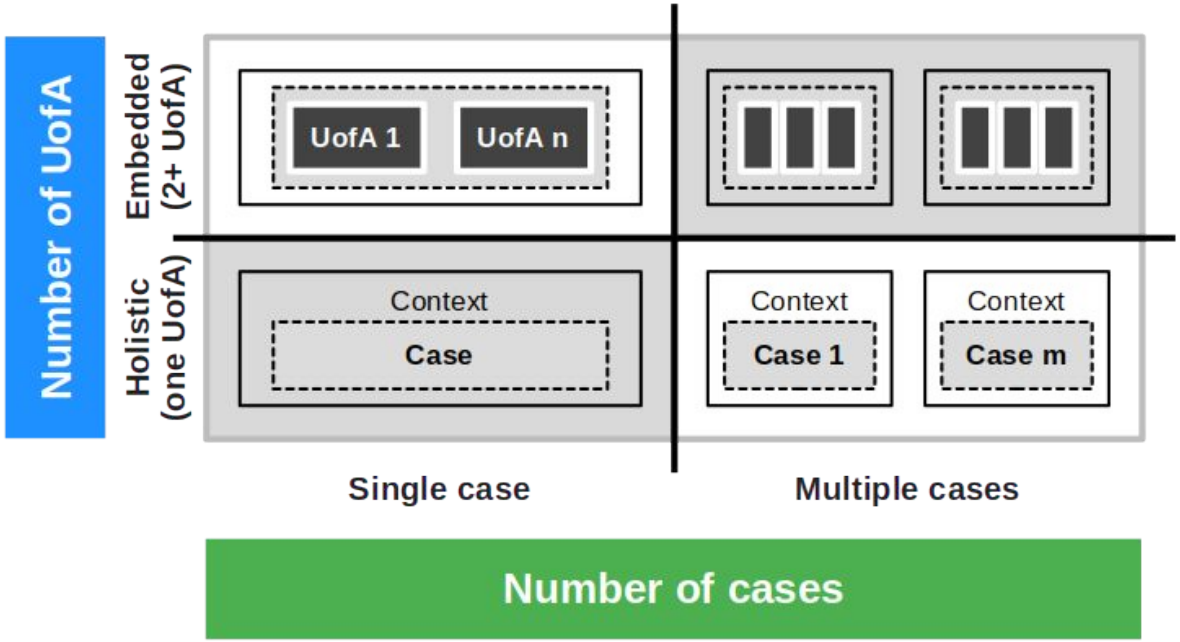
In the simplest case (no pun intended), the case is the unit of analysis

Example CSR Problems in PLE Units of Analysis

(Potential) units of analysis

1. The overall business unit
2. The product organizational units
3. The platform organizational unit
4. The business unit leader
5. Engineering managers
6. Architects / developers

Dimensions of Case Study Research Design 2 / 2



Single-Case Case Study Research

Types of single-case case study research according to Yin (2009)

- Special cases
  - The **critical** case
  - The **unique / extreme** (rare and/or particularly interesting) case
  - The **revelatory** case
- The **typical (representative)** case
- The **longitudinal** case

Multiple-Case Case Study Research

Case replication

- Literal replication to strengthen findings
- Theoretical replication to contrast and extend findings

Purposive sampling (not statistical sampling)

Exploration vs. Evaluation Revisited

Exploratory case study research prefers

- Theoretical replication **to go broad**

Evaluatory case study research preferes

- Literal replication **to go deep**

Example Multiple-Case CSR Design With Replication Logic

		Inner source approach (IS)		
		Unit of analysis 1, case 1	**Unit of analysis 1, case 2**	**Unit of analysis 1, case 3**
Dedicated organization approach (DO)	**Unit of analysis 2, case 1**	[1] Direct comparison of IS and DO from case 1	[a] Cross-case 1 + 2 IS analysis	[b] Cross-case 1 + 3 IS analysis
	Unit of analysis 2, case 2	[x] Cross-case 1 + 2 DO analysis	[2] Direct comparison, [i] Replication of case 1	Not planned
	Unit of analysis 2, case 3	[y] Cross-case 1 + 3 DO analysis	Not planned	[3] Direct comparison, [ii] replication of case 1 + 2

Direct comparison = [1], [2], [3]
Cross-case unit-of-analysis comparisons = [a], [b], and [x], [y]
Replication of case analyses = [i], [ii]

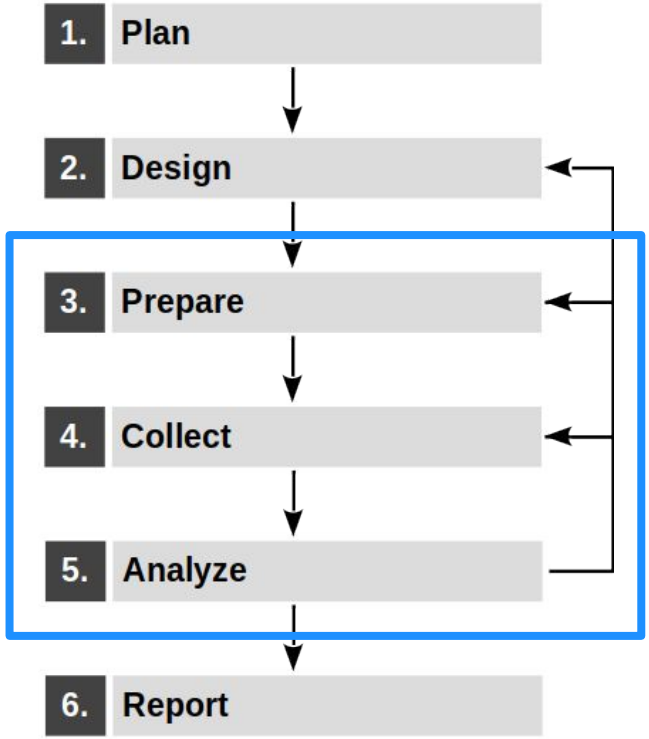
3. Case Study Research Execution

Case Study Research Execution

During execution, you iterate over

1. Prepare cases
2. Collect data
3. Analyze data

Until a stopping criterion is reached



3. Prepare

- **Goal**
  - Prepare for how to gather the data
  - **Document procedures in case study protocol**

- Consider **research ethics**
  - Gain ethics committee approval
  - Discuss researchers' conflicts of interests, subjective views

- **Conduct pilot case study**
  - Refine data collection plans, spot holes
  - Choose pilot case for convenience, access, geographic proximity

3. Prepare: Case Study Protocol (1)

- Definition of case study protocol
  - Structured guidance for data gathering
  - Includes procedures, interview questions, etc.

- Purpose of case study protocol
  - Increase effectiveness, focus, reduce error
  - If followed properly, improves case study reliability

3. Prepare: Case Study Protocol (2)

- Suggested case study protocol structure [Y09]
  - Section A: Overview of the case study design, context
    - Objectives, research questions
    - Background literature, readings
  - Section B: Data gathering procedures
    - Strategy for protecting human subjects
    - Identification of likely sources of data (identification of interviewees)
    - Logistical reminders
  - Section C: Data collection questions
    - Fine-grained questions for the researcher to keep in mind
    - Link of questions to data sources
  - Section D: Guide for case study report
    - Requirements to the data to enable later report of the findings

4. Stopping Criterion

5. Quality Assurance

4. Collect

- Follow the case study protocol

- The four principles of data collection [Y09]
  - **Use multiple sources of evidence**
    - See last weeks remarks on triangulation
  - Create a case study database
    - Arranges collected evidence, researchers' interpretation
    - Can be shared as part of reporting
  - Maintain a chain of evidence
    - Increases reliability of results
  - Exercise care when using data from electronic sources
    - Information overload; cheap collection, expensive analysis
    - Incorrect claims about authorship in social networks

4. Collect: Data Sources (1)

- Interviews
  - Discussion about a topic following a guideline (structured) or not (unstructured)
  - Strengths:
    - Targeted to case study research question
    - Provides deep explanations and personal views of interviewees.
  - Weaknesses
    - Bias to poorly articulated questions
    - Response bias (tendency to give wrong answers, e.g. answers that are socially acceptable)
    - **Reflexivity bias (interviewer gives what researcher wants to hear)**

4. Collect: Data Sources (2)

- Direct observations
  - Observation of a phenomenon by the research, e.g. “shadowing” an individual
  - Strengths:
    - Covers actions in real time
    - Cover case's context
  - Weaknesses:
    - High costs / time investment
    - Potential reflexivity bias

4. Collect: Data Sources (3)

- Participant observations
  - Observation from the role of a participant, e.g. joining as a worker in a studied company
  - Strengths:
    - Insights into interpersonal behavior
    - Same as for observations
  - Weaknesses:
    - Bias due to manipulation of events,
    - Same as for direct observation

4. Collect: Data Sources (4)

- Documentation
  - Letters, calendars, meeting minutes, administrative documents, progress reports, written reports
  - Strengths:
    - Stable
    - Specific (with a lot of details)
    - Can deliver historical insights
  - Weaknesses:
    - Selection bias
    - Retrievability, getting access
    - Reporting bias

4. Collect: Data Sources (5)

- Archival records
  - Records form government archives, case internal archives (e.g. configuration management systems)
  - Strengths:
    - Stable
    - Specific (with a lot of details)
    - Can deliver historical insights
  - Weaknesses:
    - Selection bias
    - Retrievability, getting access
    - Reporting bias

4. Collect: Data Sources (6)

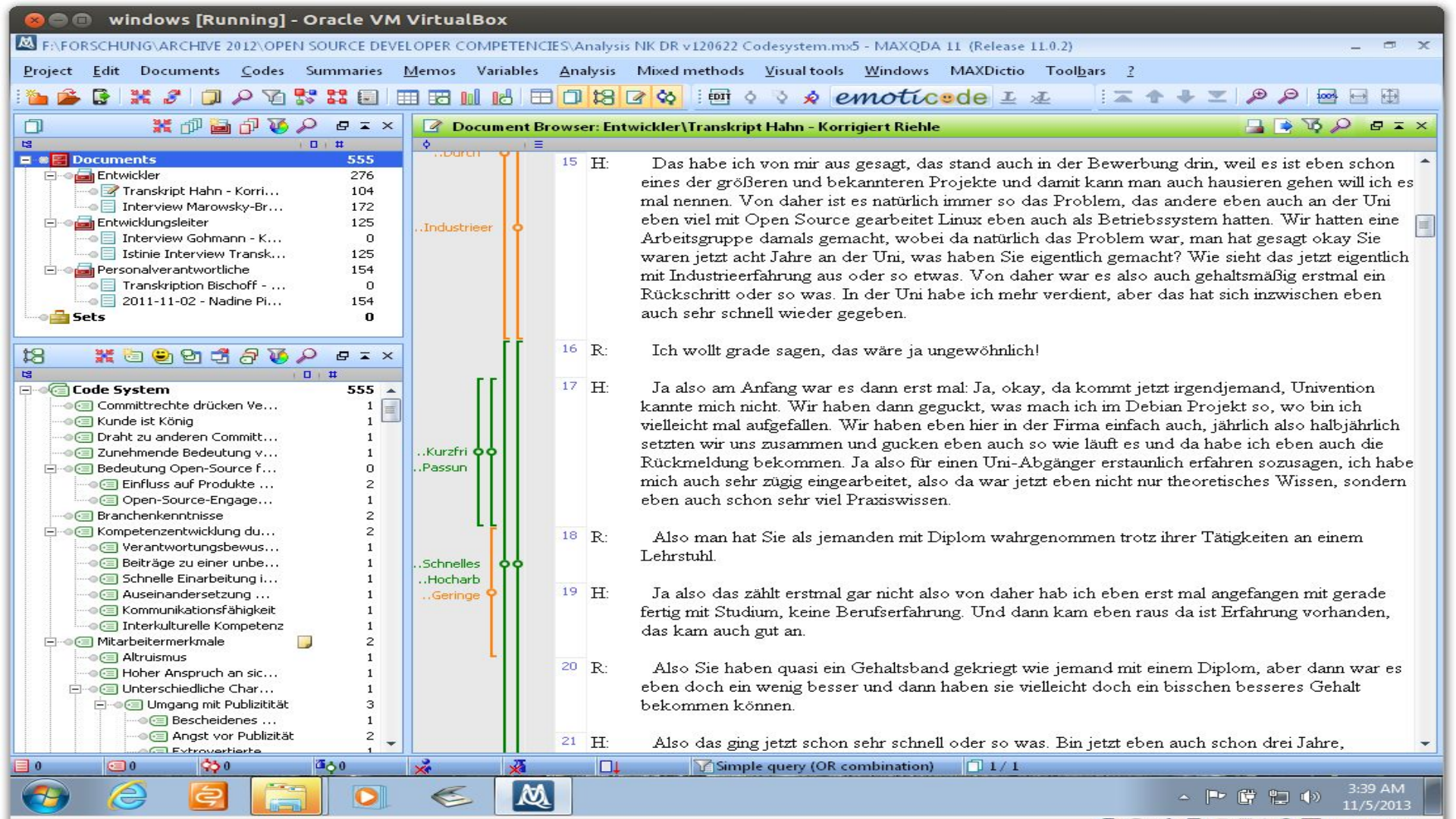
- Physical artifacts
  - Works of art, tools and devices, buildings, office space

Example of 4. Collect

- Interview
  - Performed 3 interviews per case
- Direct observations
  - Observed 3 to 5 workshops for two cases
  - Did not perform direct observations for one case
- Documentation
  - Reviewed process documentation and training materials

5. Analyze

- Use theoretical propositions
  - Search evidence to (in-)validate propositions
- **Work data from the “ground up”**
  - Alternative to “relying on theoretical propositions”
  - **Search for patterns and analyze using appropriate research methods**
- Develop a case description
  - Organize case study data according to a preexisting descriptive framework
  - Fallback solution if other methods don’t work
- Examine rival explanations
  - Try to define and test rival explanations to the ones identified in the analysis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Documents 555
Entwickler 276
Transkript Hahn - Korri... 104
Interview Marowsky-Br... 172
Entwicklungsleiter 125
Interview Gohmann - K... 0
Istinie Interview Transk... 125
Personalverantwortliche 154
Transkription Bischoff - ... 0
2011-11-02 - Nadine Pi... 154
Sets 0
Code System 555
Committrechte drücken Ve... 1
Kunde ist König 1
Draht zu anderen Committ... 1
Zunehmende Bedeutung v... 1
Bedeutung Open-Source f... 0
Einfluss auf Produkte ... 2
Open-Source-Engage... 1
Branchenkenntnisse 2
Kompetenzentwicklung du... 2
Verantwortungsbewus... 1
Beiträge zu einer unbe... 1
Schnelle Einarbeitung i... 1
Auseinandersetzung ... 1
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15 H: Das habe ich von mir aus gesagt, das stand auch in der Bewerbung drin, weil es ist eben schon eines der größeren und bekannteren Projekte und damit kann man auch hausieren gehen will ich es mal nennen. Von daher ist es natürlich immer so das Problem, das andere eben auch an der Uni eben viel mit Open Source gearbeitet Linux eben auch als Betriebssystem hatten. Wir hatten eine Arbeitsgruppe damals gemacht, wobei da natürlich das Problem war, man hat gesagt okay Sie waren jetzt acht Jahre an der Uni, was haben Sie eigentlich gemacht? Wie sieht das jetzt eigentlich mit Industrieerfahrung aus oder so etwas. Von daher war es also auch gehaltsmäßig erstmal ein Rückschritt oder so was. In der Uni habe ich mehr verdient, aber das hat sich inzwischen eben auch sehr schnell wieder gegeben.
16 R: Ich wollt grade sagen, das wäre ja ungewöhnlich!
17 H: Ja also am Anfang war es dann erst mal: Ja, okay, da kommt jetzt irgendjemand, Univention kannte mich nicht. Wir haben dann geguckt, was mach ich im Debian Projekt so, wo bin ich vielleicht mal aufgefallen. Wir haben eben hier in der Firma einfach auch, jährlich also halbjährlich setzten wir uns zusammen und gucken eben auch so wie läuft es und da habe ich eben auch die Rückmeldung bekommen. Ja also für einen Uni-Abgänger erstaunlich erfahren sozusagen, ich habe mich auch sehr zügig eingearbeitet, also da war jetzt eben nicht nur theoretisches Wissen, sondern eben auch schon sehr viel Praxiswissen.
18 R: Also man hat Sie als jemanden mit Diplom wahrgenommen trotz ihrer Tätigkeiten an einem Lehrstuhl.
19 H: Ja also das zählt erstmal gar nicht also von daher hab ich eben erst mal angefangen mit gerade fertig mit Studium, keine Berufserfahrung. Und dann kam eben raus da ist Erfahrung vorhanden, das kam auch gut an.
20 R: Also Sie haben quasi ein Gehaltsband gekriegt wie jemand mit einem Diplom, aber dann war es eben doch ein wenig besser und dann haben sie vielleicht doch ein bisschen besseres Gehalt bekommen können.
21 H: Also das ging jetzt schon sehr schnell oder so was. Bin jetzt eben auch schon drei Jahre,
Simple query (OR combination)
1 / 1
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Case Studies in Theory Evaluation (2)

- Theory to evaluate is postulated as framing theory in study design (phase 2)

- Guidelines for case studies in theory evaluation [Y09]
  - Triangulate evidence from multiple types of sources
  - Mix contrary methods, orientations (realist/relativist, qualitative/quantitative)
  - Give much focus to discussion rival explanations / theories

Thank you! Any questions?

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