Industrial views on DevOps adoption before and after implementation: A qualitative comparison

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Motivation – DevOps Benefits / Challenges

↑Improved software quality

↑Fast release Cycles

↑High grade of automation

↑Improved scalability

↑Reduced Costs

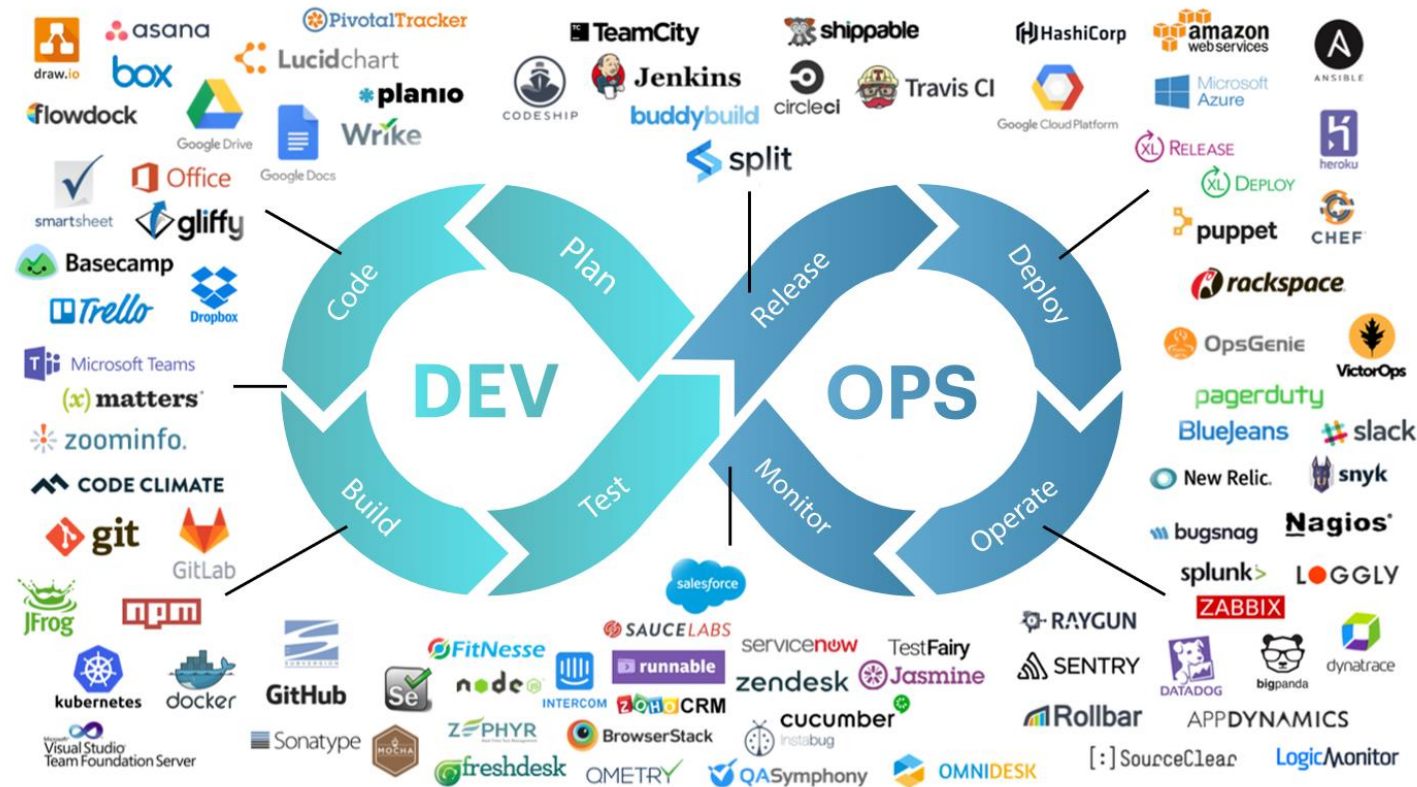↓Scepticism of developers / management

↓Missing Knowledge
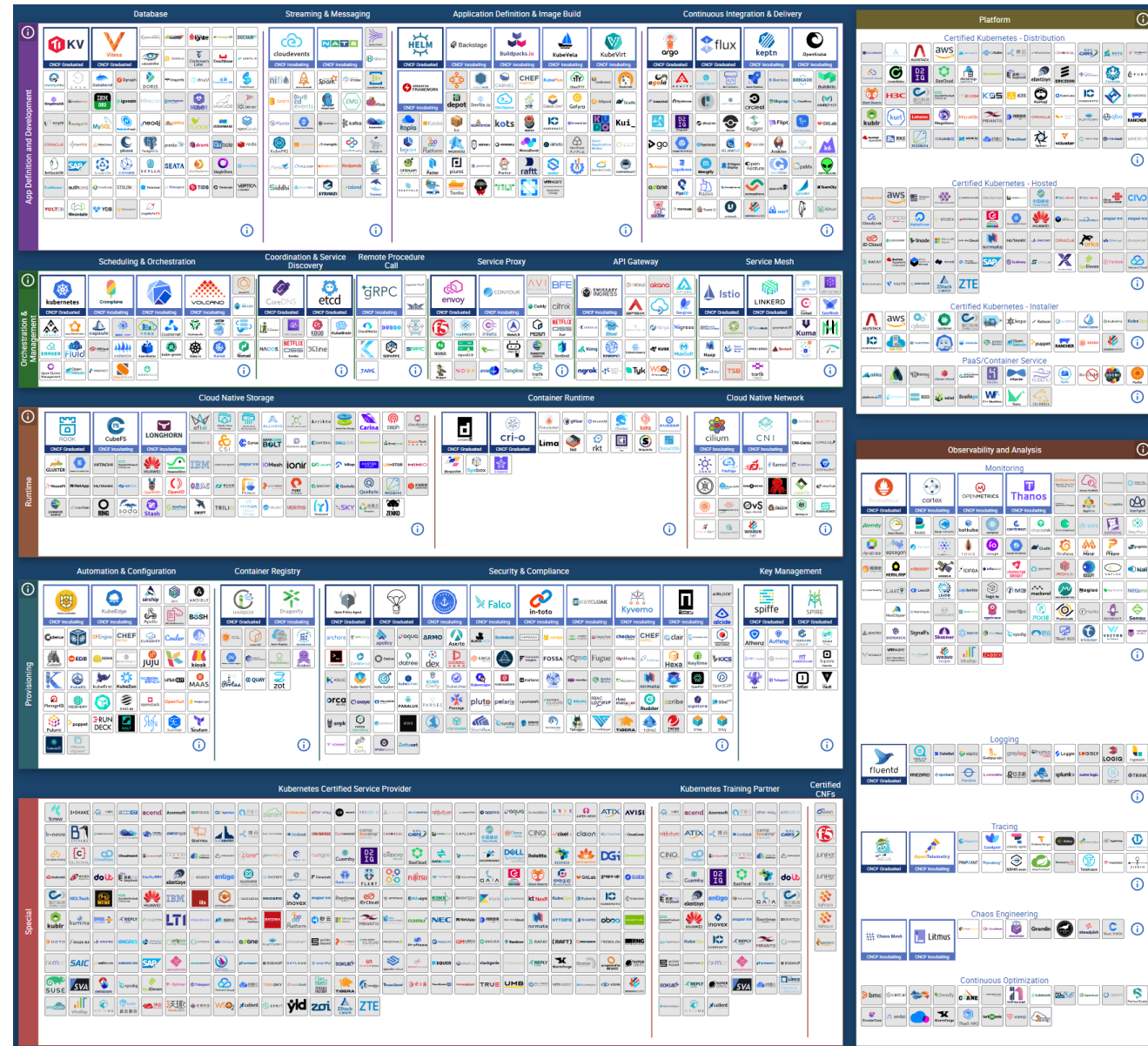
↓Complex technology stack

↓Teams need to be reorganized

↓Steep learning curves

↓Security concerns through cloud usage

Motivation – DevOps is very complex

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Motivation – What is the perspective of practitioners?
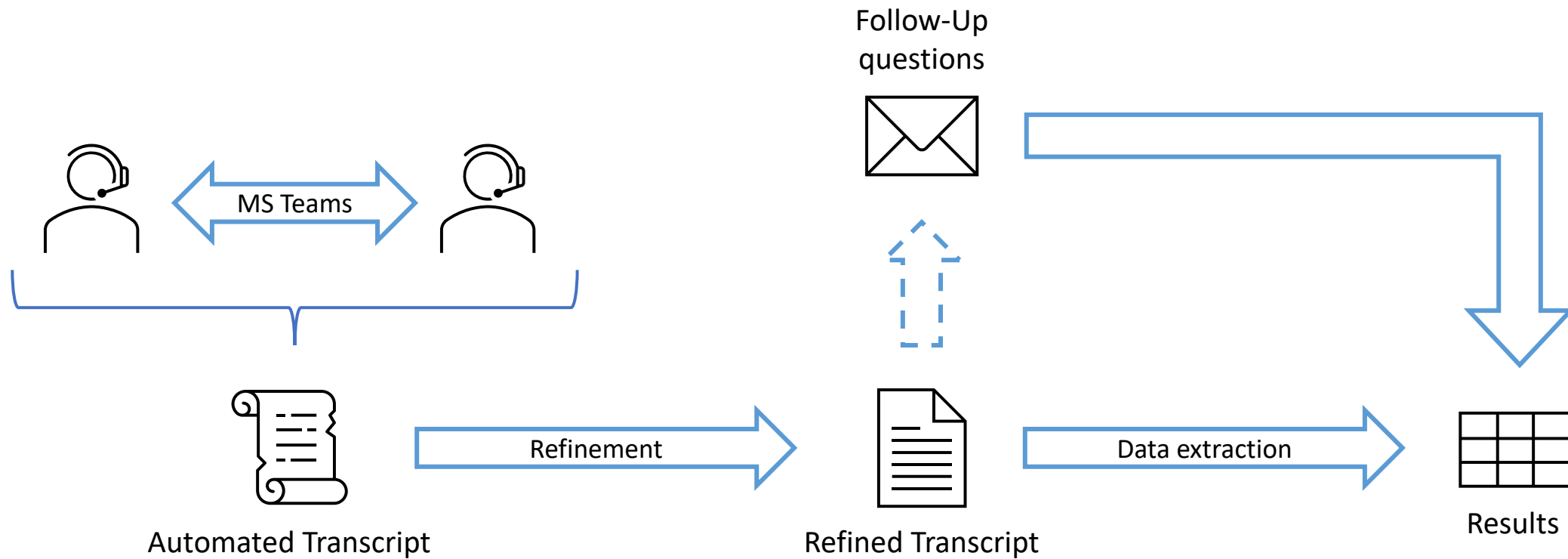
Expectations vs. Real Benefits

Adoption fears vs. Real Challenges

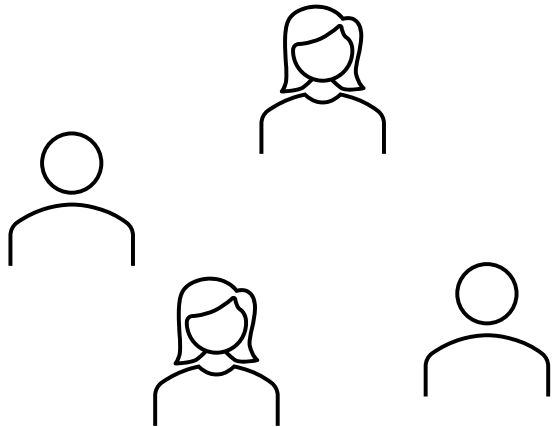Reasons for adopting vs. Why was adopted

Goals

- RQ1: How do the expectations of DevOps differ from reality?
  - RQ1.1: How do expected benefits compare to experienced ones?
  - RQ1.2: How do reasons for not adopting DevOps compare to experienced obstacles?

- RQ2: Are the reasons for adopting DevOps in change?
  - RQ2.1: What specific requirements do customers have in terms of the tools that have to be used?

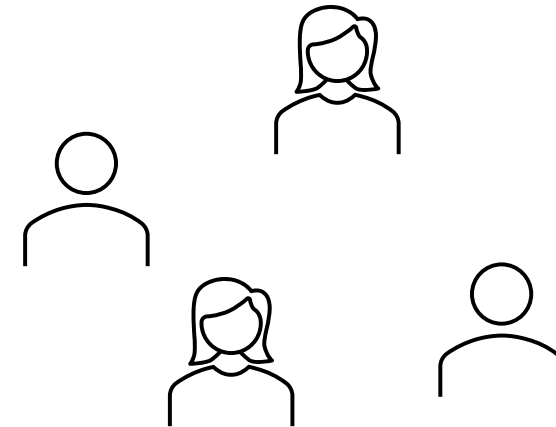# Study design – Interviews and data extraction

Study design – Grouping

About to adopt DevOps (G1)

Have adopted DevOps (G2)

Study design – Questions

Question ID	Question text
Q1	Why do you want to use DevOps in your project?
Q2	Are there any reasons why you did not use it earlier?
Q3	Were there any obstacles beforehand that prevented you from applying DevOps?
Q8	Which technologies were explicitly specified by the customer in your project?
Q9	Which specific technology were you able to choose freely?

Question ID	Question text
Q4	Why did you use DevOps for your project?
Q5	Was the introduction worthwhile?
Q6	Are there any reasons that might prompt you to migrate back?
Q7	Have you encountered any obstacles during the introduction of DevOps?
Q8	Which technologies were explicitly specified by the customer in your project?
Q9	Which specific technology were you able to choose freely?

Results – Participants

Participant ID	Company ID	Industry Sector	Position	Group
P1	C1	Heat Industry	Software Engineer	2
P2	C1	Heat Industry	Software Engineer	2
P3	C2	Energy Economics	Software Engineer	2
P4	C3	Energy Economics	Software Engineer	1
P5	C4	SAP	Technical Consultant	1
P6	C4	SAP	Technical Consultant	1
P7	C5	Multiple	Cloud Solution Architect	2
P8	C5	Multiple	Cloud Engineer	2
P9	C5	Multiple	Lead DevOps Engineer	1

Results – G1

Question ID	Answers	Participant
Q1	Pressure from outside	1 / 4
	Time savings	3 / 4
	Improve communication	1 / 4
Q2	Time-consuming migration	2 / 4
	Missing knowledge in team	2 / 4
	Not required by client	2 / 4
Q3	Not required by client	3 / 4
	Missing knowledge in team	1 / 4
Q8	CI/CD with GitLab, GitHub or Jenkins	2 / 4
	Jira, Grafana, Docker / VS Code	1 / 4
	managed Kubernetes from AWS, GCP or Azure	2 / 4
Q9	Development workflow	1 / 4
	List of authorized cloud services	2 / 4
	Programming language and frameworks, without IaC	1 / 4

"…we hope to achieve fast release cycles to roll fast with changes…"

"…our client wants to migrate the project to the cloud, therefore we need DevOps…"

Results – G2

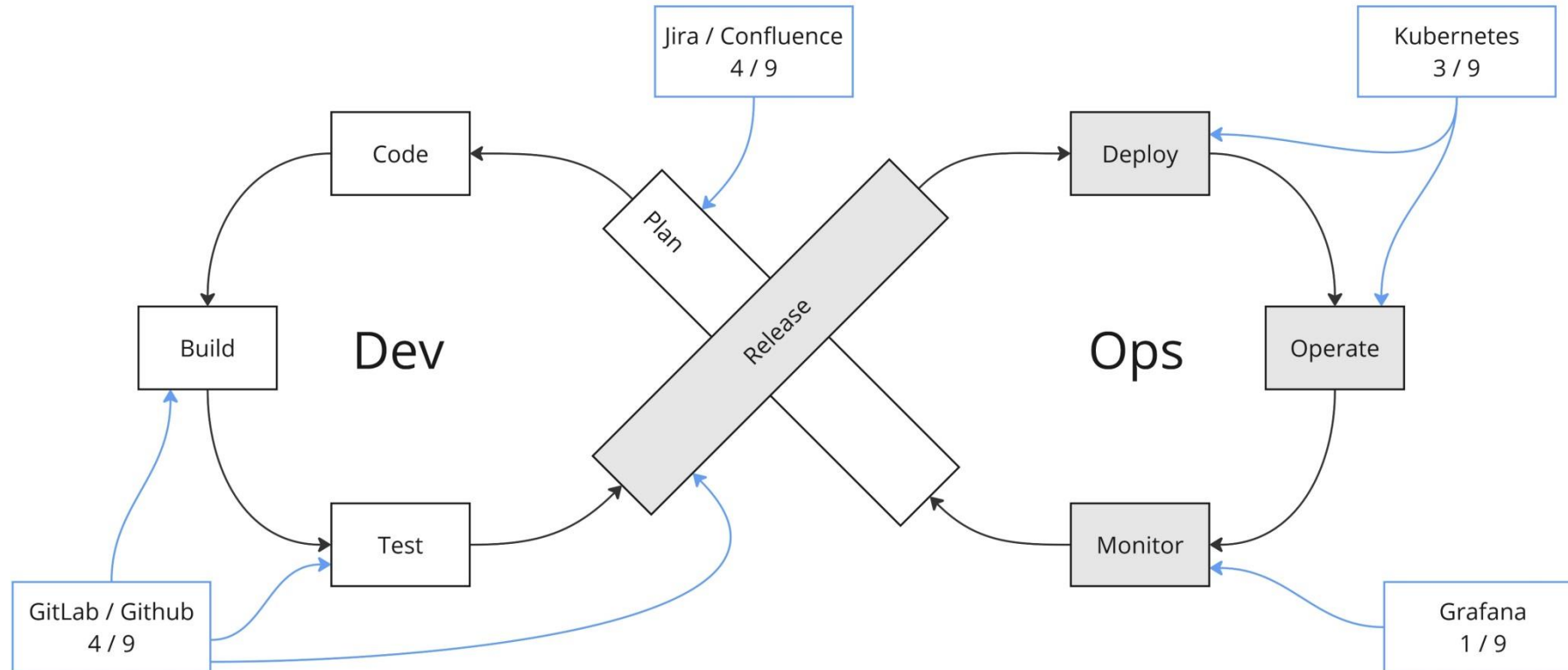| Question ID	Answers	Participant
Q4	It was a requirement of our client	3 / 5
	Without DevOps, the project cannot be built	1 / 5
	Time savings	2 / 5
	General trend to DevOps	1 / 5
Q5	Yes, project without DevOps impossible	2 / 5
	Yes, the time saving factor is huge	3 / 5
Q6	No, the drawback of losing the benefits are too critical	5 / 5
Q7	No, overhead of DevOps is prize to pay	1 / 5
	No, insight the customer's pipeline	1 / 5
	Lack of knowledge/trained personnel; steep learning curve	4 / 5
	Needed to convince individual persons	3 / 5
Q8	CI/CD with GitLab, GitHub or Jenkins	2 / 5
	Jira, Confluence, Gradle, SonarQube and Firebase	1 / 5
	Grafana	1 / 5
	managed Kubernetes from AWS, GCP or Azure	1 / 5
	Nexus	2 / 5
Q9	Could only choose the communication channel	2 / 5
	List of authorized cloud services	1 / 5

"…because of the size of the project, our client requires DevOps for automation…"

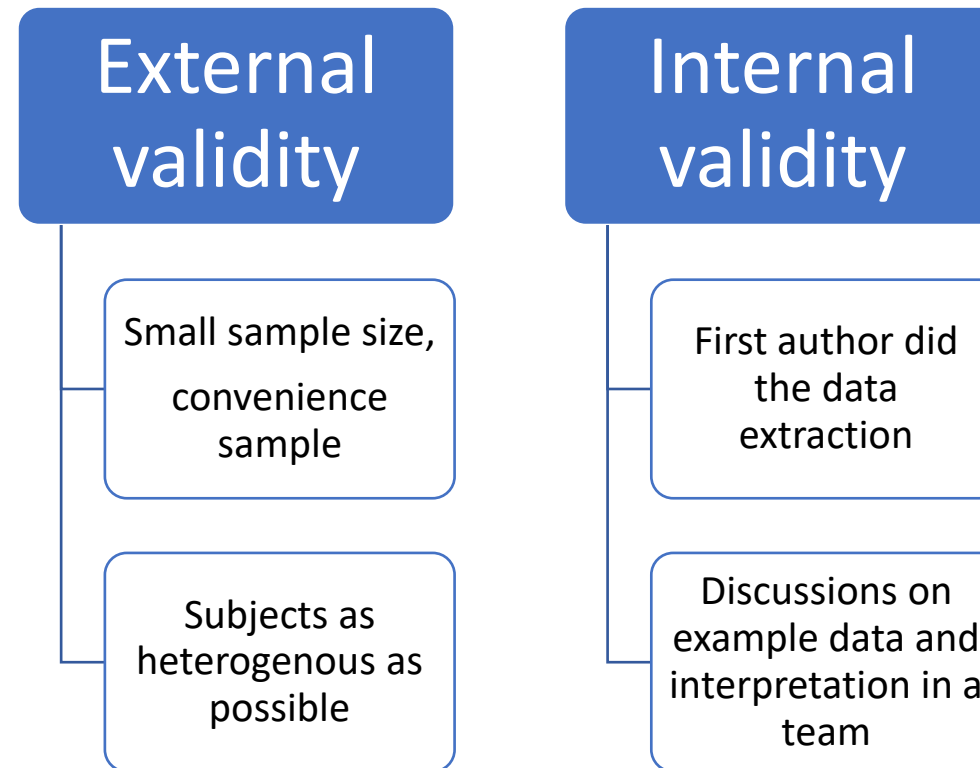"…with DevOps the creation of a POC and MVP was blazing fast…"

"…oh, hell no…"

The understanding of DevOps

Key findings

Non-adopters migrate because of the reported benefits of the adopters (RQ1.1)

Non-adopters may underestimate the complexity of cultural shift (RQ1.2)

DevOps as a requirement of the customers (RQ2)

Threats to validity

External validity

- Small sample size, convenience sample

- Subjects as heterogenous as possible

Internal validity

- First author did the data extraction

- Discussions on example data and interpretation in a team

Conclusion

Study	Findings	Still open
• 9 Participants • 5 Companies • 2 Groups	• Expectations and Experiences matching for benefits • But non-adopters underestimate the cultural shift • Customer more and more requires DevOps	• Why is the cultural shift so underestimated by the non-adopters? • How can stated challenges mitigated without adding more complexity? • Can these findings also be observed in the EU or worldwide?