Motivation

- **Recruiting professional developers is crucial for studying the company context**

- **Past research** often relied on convenience samples like CS **students or freelancers**

- **Lack of knowledge**

    How to motivate company developers in high numbers to participate in security research studies?

Literature Review

- **163 papers** conducting **developer studies (2017 – 2022)**
  - CCS, CHI, S&P, NDSS, USENIX, ICSE and SOUPS

- **Lack of Data**
  - **Only 30 papers** reported **essential study parameters**
  - **77 papers** lacked information on **compensation**
  - **62 papers** lacked information on **study length**

**Lack of study parameter information
makes it difficult to learn from past research!**

Our Study: Quantitative Survey

- **340 company developers** recruited through **Qualtrics Research Panels**
  - 73 women, 265 men
  - 187 first-time participants, 153 repeat participants
  - 105 from **Europe**, 87 from **Asia**, 82 from **North America**, 66 from **Africa**

- **We explored the following study parameters**

Study **type**
(online, field, lab)

Study task
(survey, interview, coding, code review)

Study **length**

Study **compensation**

Recruitment **channel**

Results

Study Task and Type

Participants	Study Type		Study Task			Security
	Lab	Field	Interview	Coding	Review	
First-Time	80%	94%	85%	96%	84%	99%
Repeat	81%	77%	87%	96%	94%	95%
All	81%	84%	86%	96%	89%	96%

Percentage of participants **willing to participate**

Most participants (63%) preferred **security over software engineering studies**

Study Length

Participants	Survey	Interview	Coding	Review
First-Time	30 min	38 min	65 min	60 min
Repeat	18 min	22 min	42 min	46 min
All	26 min	32 min	57 min	57 min

Average study length expectation **in minutes**

- **81%** were **willing to participate in long-term studies**, but nearly all **expected higher hourly compensation**

Study Compensation

Study Type	Survey	Interview	Coding	Review
Online	$7	$9	$13	$16
Lab	$11	$14	$19	$24
Field	$12	$16	$20	$24

Average compensation expectation in dollars for **15-minute studies**

Ethical Concerns with Inconsistent Compensation

Region	Online Survey	Field Coding
Asia	$6	$14
Africa	$20	$54
Europe	$17	$50
North America	$21	$41

Average compensation expectation in dollars for **60-minute studies**

Increasing Sample Size

Percentile	Online Survey	Field Coding
10%	$5	$10
25%	$14	$20
33%	$15	$25
50%	$20	$30
66%	$25	$50
75%	$30	$60
90%	$35	$80

Compensation recommendation based on
60-minute studies in North America in dollar

Recruiting via Qualtrics.com?

Advantage

+ **High number** of **company developers**
+ **International** sample
+ **Low** effort

Disadvantage

– **High** screening **rejection rate**
– **Data quality issues**
– **High costs**

Call to Action!

- ## Ensure Consistent & Ethical Compensation
  - ### Based on **Location**
  - ### Participants' **Expectations & Effort**

- ## Be Transparent
  - ### Report **All Study Parameters**

Table 1: Study Parameters.

Study Type	Online
Study Task	Survey
Study Language	English
Study Length	mean: 32.77 min (md: 28.5, σ: 18.85)
Recruitment Channel	Qualtrics Research Panels
Recruitment Duration	2.5 months
Participants	Company Developers ($n = 340$)
Compensation	$62.15 per participant (or Reward Points)