

The Privacy and Security Behaviors of Smartphone App Developers

Rebecca Balebako, Abigail Marsh,
Jialiu Lin, Jason Hong, Lorrie Faith
Cranor

**Carnegie
Mellon
University**

CyLab

**Engineering &
Public Policy**



App Developer decisions

- Privacy and Security features compete with
 - Features requested by customers
 - Data requested by financiers
 - Revenue model



Research Project

- Exploratory Interviews
- Quantitative on-line study

Findings

- Small companies lack privacy and security behaviors
- Small company developers rely on social ties for advice
- Legalese hinders reading and writing of privacy policies
- Third-Party tools heavily used

Participant Recruitment

- 13 developers interviewed
- Recruited through craigslist and Meetups
- \$20 for one-hour interview

Participant Demographics

- Variety of revenue models
 - Advertising
 - Subscription
 - Pay-per-use
 - Non-Profit
- Seven different states
- Small company size well-represented

Tools impact privacy and security

- Interviewees do:
 - Use cloud computing
 - Use authentication tools such as Facebook
 - Use analytics such as Google and Flurry
 - Use open source tools such as mysql

Tools not used

- Interviewees don't use or are unaware of:
 - Use privacy policy generators
 - Use security audits
 - Read third-party privacy policies
 - Delete data



On-line surveys

- 228 app developers
- Paid \$5 (avg: 15 minutes)
- Recruited through craigslist, reddit, Facebook, backpage.com
- Developer demographics
 - Majority were 'Programmer or Software Engineer' or 'Product or Project Manager'
 - Avg age: 30 (18-50 years)

Company demographics

- Platforms
 - iOS (62%)
 - Android (62%)
 - Windows (17%)
 - Blackberry (4%)
 - Palm (3%)
- Large Company Size well-represented

Data collected or stored

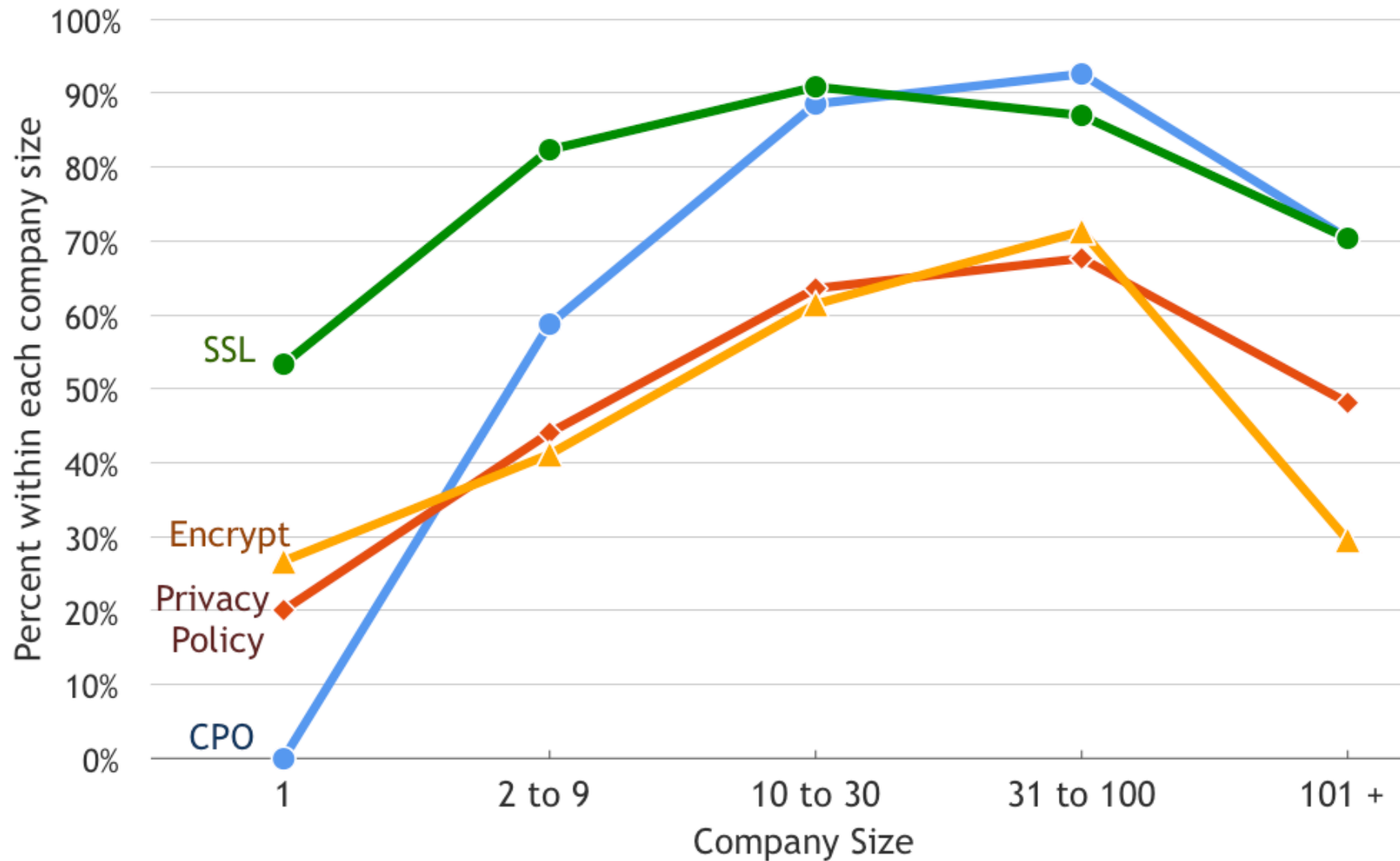
Behavior	Collect or Store
Parameters specific to my app	84%
Which apps are installed	74%
Location	72%
Sensor information (not location-related)	63%

Privacy and security behaviors

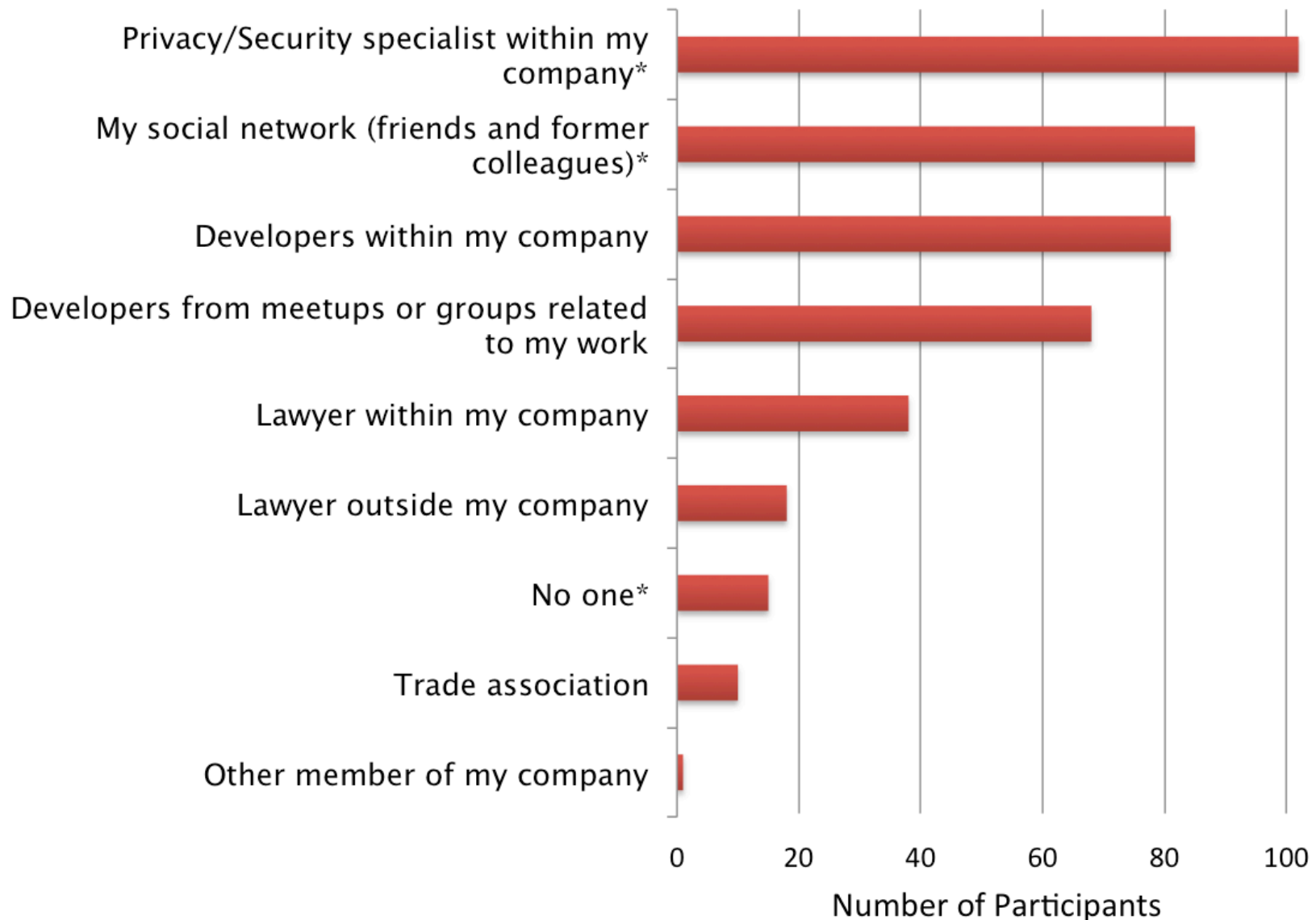
Behavior	Percent
Use SSL	84%
Encrypt everything (all data collected)	57%
Have CPO or equivalent	78%
Privacy Policy on website	58%

- Room for improvement!

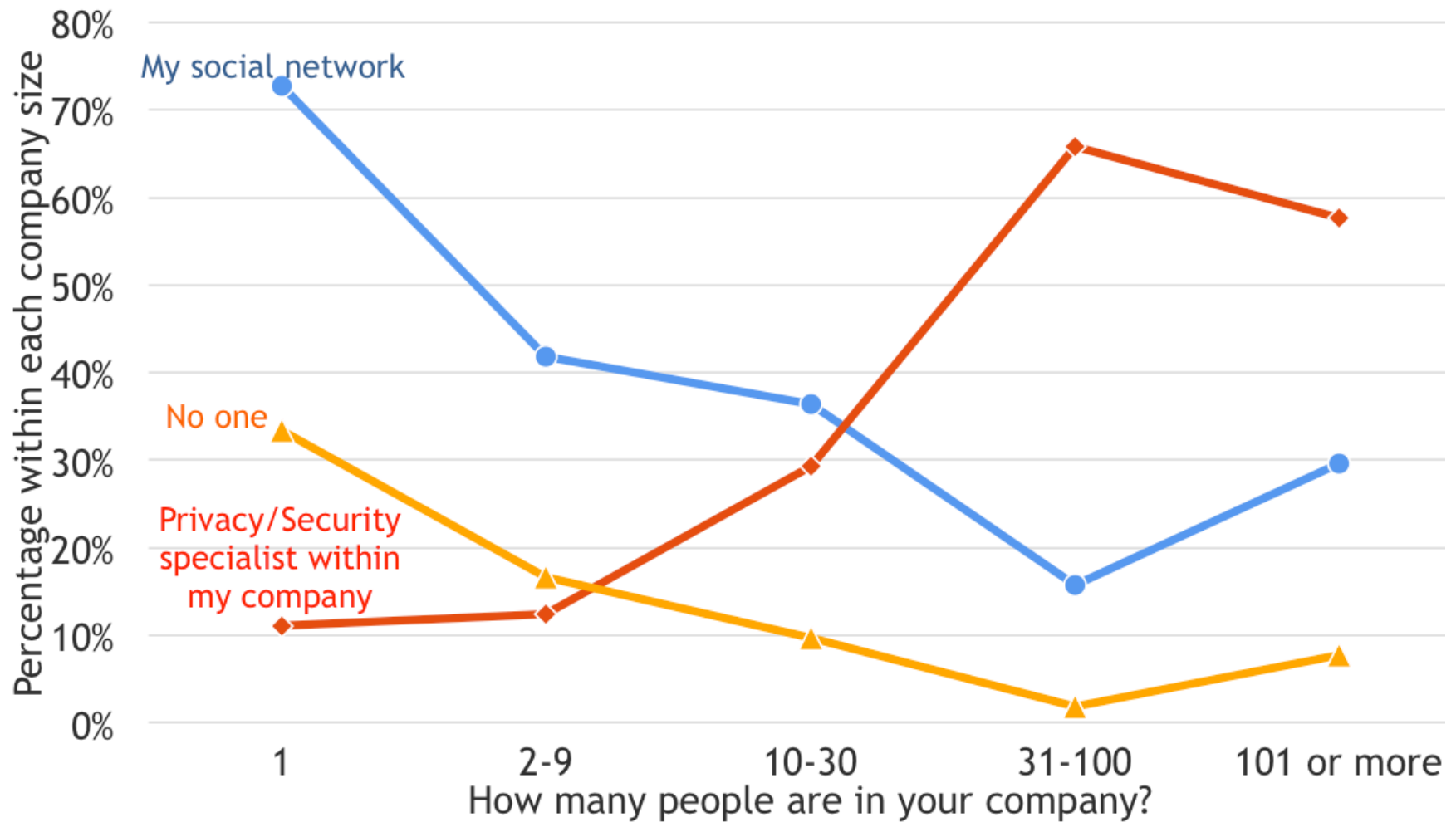
Company size and behaviors



Who do you turn to?



Who do you turn to?



Ad and analytics heavily used

- 87.4% use at least one analytics company
- 86.5% use at least one advertising company

Third-party tools

PRIVACY ON THE GO

RECOMMENDATIONS FOR THE MOBILE ECOSYSTEM

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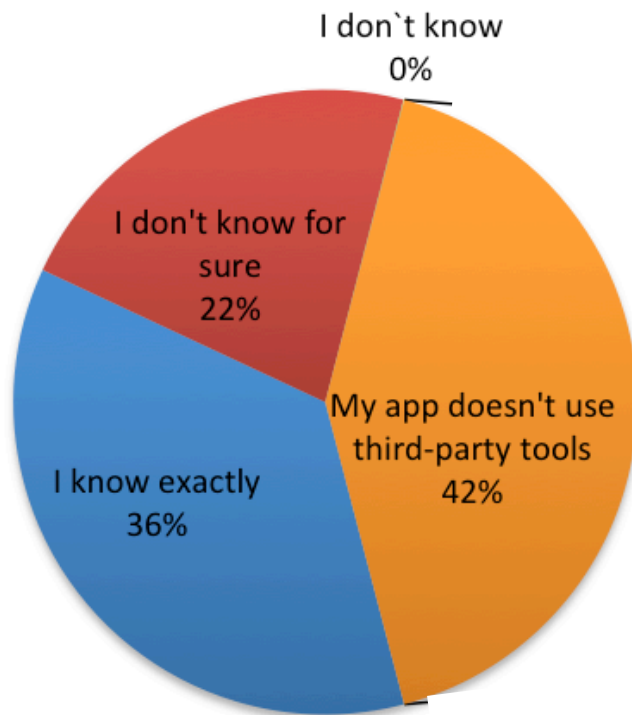


- Explain the intended uses and any third parties to whom user data would be disclosed.



Kamala D. Harris, Attorney General
California Department of Justice

How Familiar Are You With The Types Of Data Collected By Third-Party Tools



Findings

- Small companies lack privacy and security behaviors
 - Free or quick tools needed
 - Usable tools needed
- Small company developers rely on social ties for advice
 - Opportunities for intervention in social networks
- Legalese hinders reading and writing of privacy policies
- Third-Party tools heavily used
 - Third-party tools should be explicit about data handling

Questions?

balebako@cmu.edu

Privacy Policies Are Not Considered Useful

“I haven’t even read [our privacy policy]. I mean, it’s just legal stuff that’s required, so I just put in there.” – P4

Developers have time and resource constraints

- “I don’t see the time it would take to implement that over cutting and pasting someone else’s privacy policies.... I don’t see the value being such that that’s worth it.”

-P10

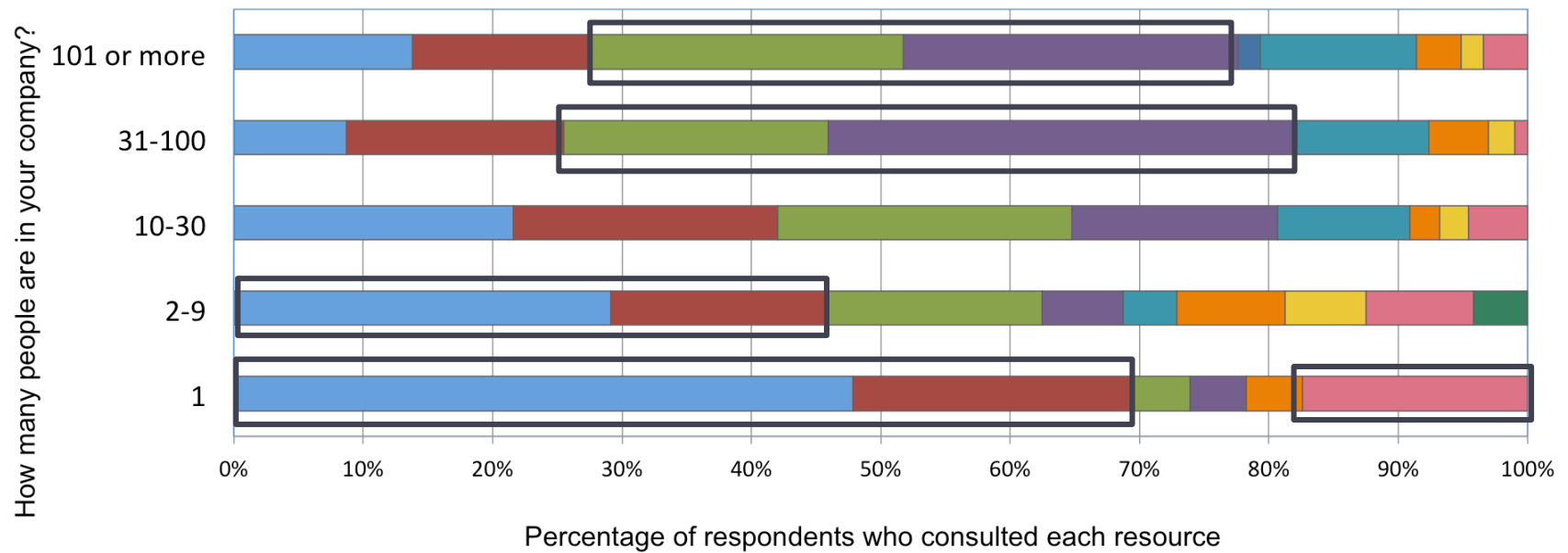
Privacy and security behaviors

Behavior	Percent
Use SSL	83.8%
Encrypt data on phone	59.6%
Encrypt data in database	53.1%
Encrypt everything (all data collected)	57.0%
Revenue from advertising	48.2%
Have CPO or equivalent	78.1%
Privacy Policy on website	57.9%

Ad and analytics

Ad or analytic provider	percent
Google analytics	82%
Google ads	64%
Flurry analytics	17%
No ads	13%
No analytics	13%

Advice



- My social network (Friends, former colleagues)
- Developers within my company
- Other member of my company
- Lawyer outside my company
- No one

- Developers from meetups or groups related to my work
- Privacy/Security specialist within my company
- Lawyer within my company
- Trade association
- Other