



Australia's National Science Agency

# Is It a Trap? A Large-scale Empirical Study And Comprehensive Assessment of Online Automated {Privacy Policy Generators} for Mobile Apps

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# Examples of privacy policies

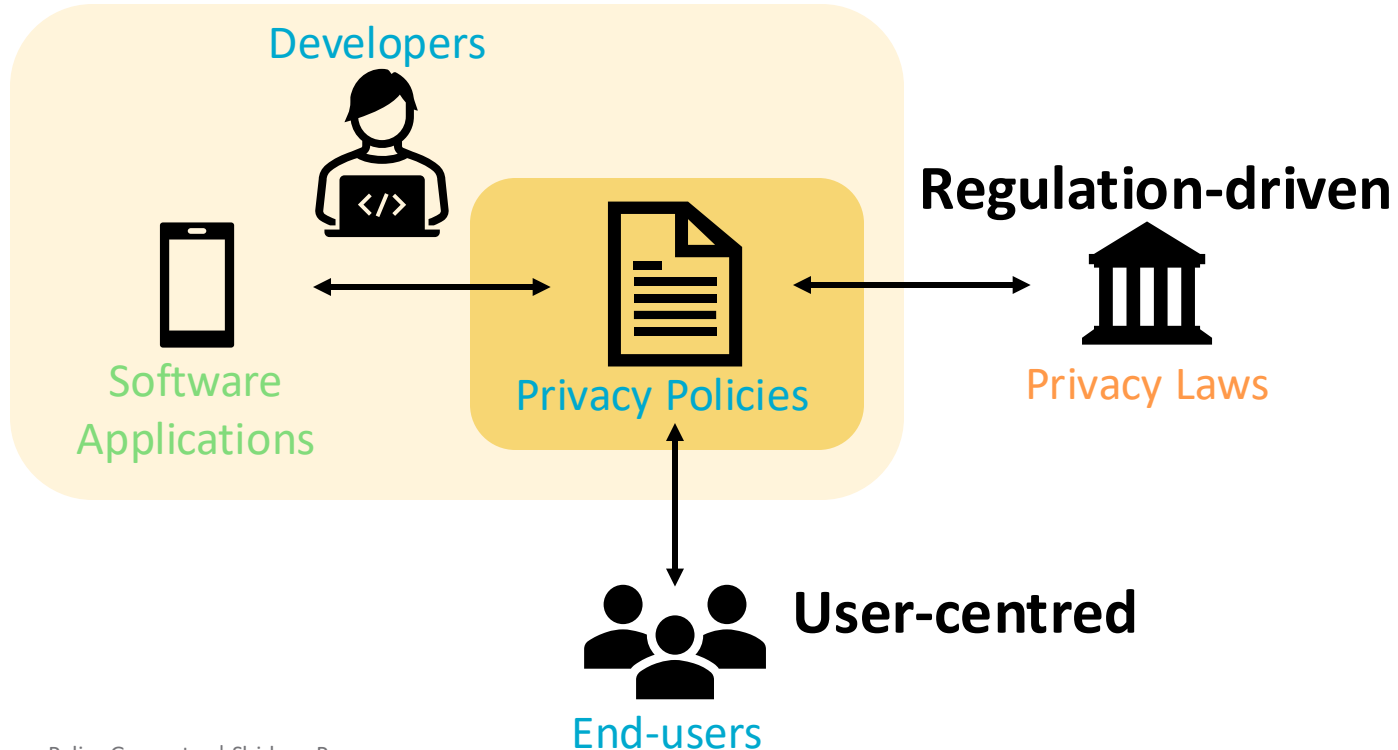
The screenshot shows the Meta Privacy Center interface. On the left is a navigation sidebar with the Meta logo at the top, followed by 'Privacy Center'. Below this are several menu items: 'Manage your accounts' (with a user icon and 'Accounts Center' below it), 'Privacy Center home', 'Search', and 'Privacy Policy' (with a lock icon). Under 'Privacy Policy', there are several sub-headers: 'What is the Privacy Policy and what does it cover?', 'What information do we collect?', 'How do we use your information?', 'How is your information shared on Meta Products or with integrated partners?', 'How do we share information with third parties?', 'How do the Meta Companies work together?', 'How can you manage or delete your information and exercise your rights?', and 'How long do we keep your information?'. The main content area is titled 'Privacy Policy' and 'What is the Privacy Policy and what does it cover?'. It includes a 'Highlights' section with a star icon and a dropdown arrow. The text explains that Meta wants users to understand information collection and usage, and provides links to a printable version and previous versions. It also includes sections for 'What Products does this policy cover?' and 'Learn more in Privacy Center about managing your privacy', both with right-pointing arrows. A second 'Highlights' section is visible at the bottom of the main content area.

Facebook/Meta  
> 20,000 words

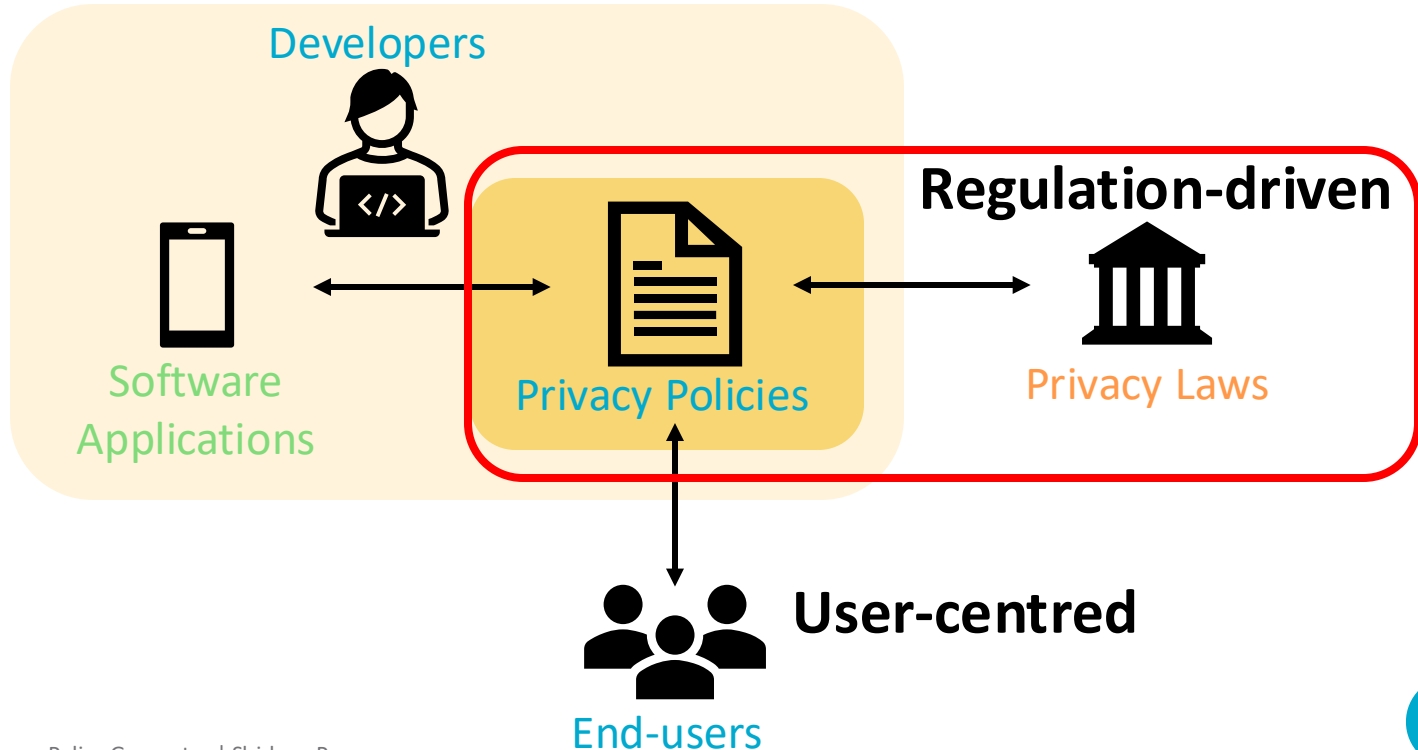
The screenshot shows a simple, clean privacy policy document. The title 'Privacy Policy' is centered at the top in a large blue font. Below the title, there is a short introductory paragraph: 'This is the general privacy policy of my applications which is applicable to all the apps that I have on Google Play Store.' This is followed by a section titled 'Privacy Policy explains:' with three bullet points: 'What information we collect and why we collect it.', 'How we use that information.', and 'The choice we offer, including how to access and update information.' Below this is an 'Important:' section with a paragraph explaining that permissions are optional and not mandatory. This is followed by a 'Permissions:' section with a paragraph stating that permissions are explained in each application and that none are mandatory. The document concludes with a sentence: 'For any further queries, please do email me at developer contact email address'.

Easy Communication  
1k installs, 156 words

# The privacy policy is the **pivot** of current software privacy ecosystem



# The privacy policy is the **pivot** of current software privacy ecosystem



# Privacy Policies are commonly problematic!

## POLIGRAPH: Automated Privacy Policy Analysis

Hao ( )  
ar  
Detection of Inconsistencies in Privacy Practices of  
Browser Extensions

<https://w>

*Abstract*—All major  
provide additional funct  
experience while the exte  
during their web browsi

Fuman Xie  
University of Queensland  
Australia

Suwan Li  
Nanjing University  
China

Scrutinizing Privacy Policy Compliance of  
Virtual Personal Assistant Apps



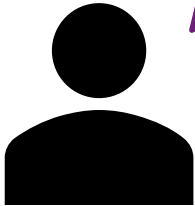
## Polisis: Automated Analysis and Presentation of Privacy Policies Using Deep Learning

Hamza Harkous, *École Polytechnique Fédérale de Lausanne (EPFL)*;  
Kassem Fawaz, *University of Wisconsin-Madison*; Rémi Lebret, *École Polytechnique Fédérale  
de Lausanne (EPFL)*; Florian Schaub and Kang G. Shin, *University of Michigan*;  
Karl Aberer, *École Polytechnique Fédérale de Lausanne (EPFL)*

<https://www.usenix.org/conference/usenixsecurity18/presentation/harkous>

# Motivation (1/3)

Where did those problematic privacy policies come from?



The screenshot displays a user interface for a Privacy Policy. At the top, there's a navigation bar with 'Privacy Center' and 'Privacy Policy' tabs. Below this, a search bar and a 'Highlights' dropdown are visible. The main content area is titled 'Information we collect and hold' and includes a table with columns for 'Purpose' and 'The Personal Information We Collect'. Below the table, there's a section titled 'How we use and share it' with a list of purposes and a 'Learn more' link. The bottom part of the screenshot shows a 'Privacy Policy' header and a 'Hamza Games Online SERVICES PRIVACY NOTICE' section, which includes the text: 'This notice explains how Hamza Games Online Corporation (referred to as "we" in this notice) collects, stores, uses, or otherwise processes the personal data of end users of our Services as defined below (referred to as "you" in this notice), and what rights you have if we are processing your personal data.'

# Motivation (2/3)

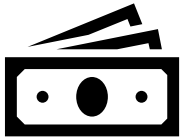
The screenshot displays the Google Play Console interface. At the top, there is a search bar and a 'Data Safety Report Generator' button. The main content area is titled 'Privacy policy' and includes instructions: 'Add a privacy policy to your Store Listing to help provide transparency about how you treat sensitive user and device data. [Learn more](#)'. Below this, it states: 'You must add a privacy policy if your target audience includes children under the age of 13. Check the [user data policy](#) to avoid common violations.' A text input field is provided for the 'Privacy policy URL', with a placeholder text: 'Enter a URL, for example https://example.com/privacy'. The left sidebar contains navigation options under 'Quality', 'Monetise', and 'Policy and programmes'.

Developers publish and manage their apps in the Google Play Console.

# Motivation (3/3)



Citizen  
developers



Legal knowledge  
and resource

most  
citizen developers  
**do not have**  
**legal support!**

1. They may **copy-paste-modify** existing privacy policies, ad-hoc.
2. Ask ChatGPT to generate one.
3. Maybe something else?



# Online Automated Privacy Policy Generator (APPG) as the Solution

**1**

**2**

**3**

4

5

6

7

8

9

## Privacy Policy Generator

### What kind of personal information do you collect from users?

Click all that apply

- Email address
- First name and last name
- Phone number
- Address, State, Province, ZIP/Postal code, City
- Social Media Profile information (ie. from Connect with Facebook, Sign In With Twitter)
- Others

### Select additional information you collect from a device (mobile/tablet)

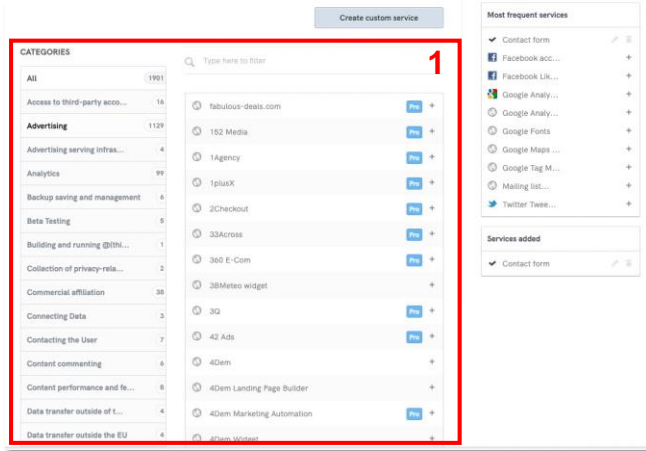
Skip selecting an option if none apply to you

- Location (GPS)
- Phonebook (Contacts list)
- Camera (Pictures)

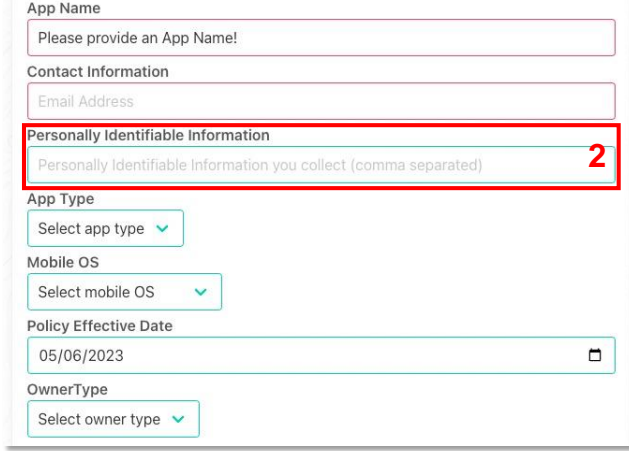
← PREVIOUS STEP

NEXT STEP →

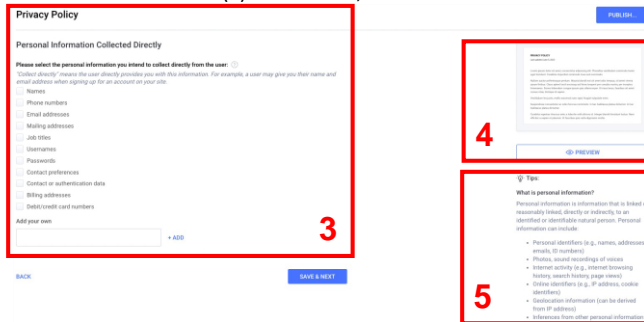
# Online Automated Privacy Policy Generator (APPG)



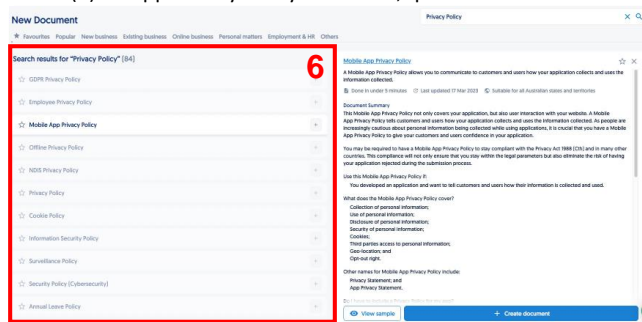
(a) #1 Iubenda, UI-mode



(b) #2 App Privacy Policy Generator, questionnaire-mode

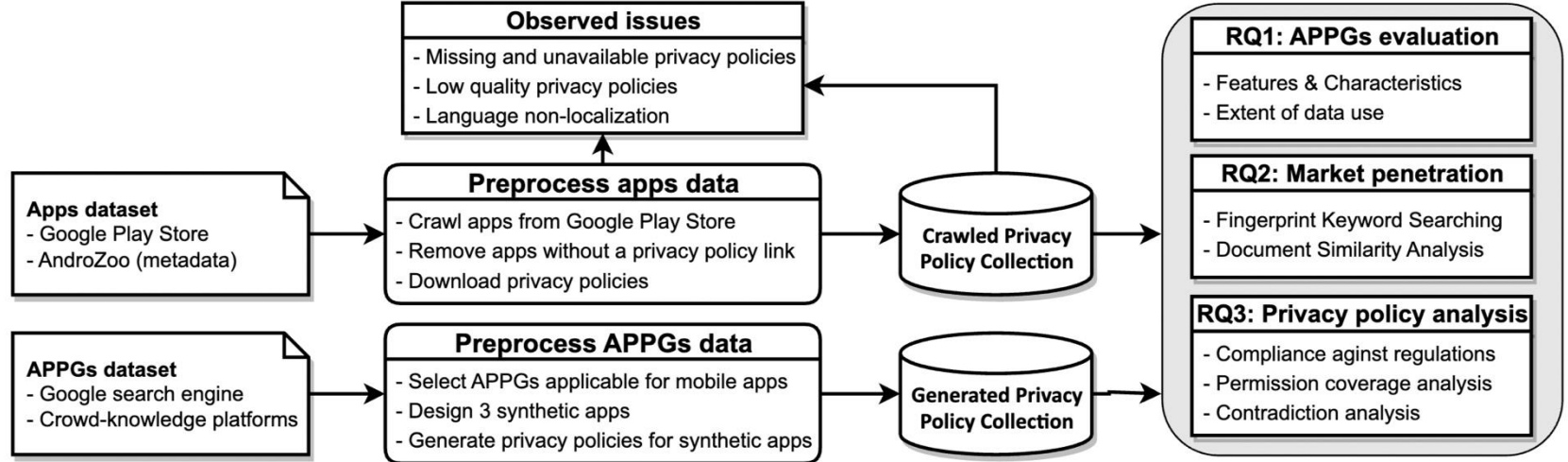


(c) #3 Termy, questionnaire-mode



(d) #10 Lawpath, document-mode

# Methodology

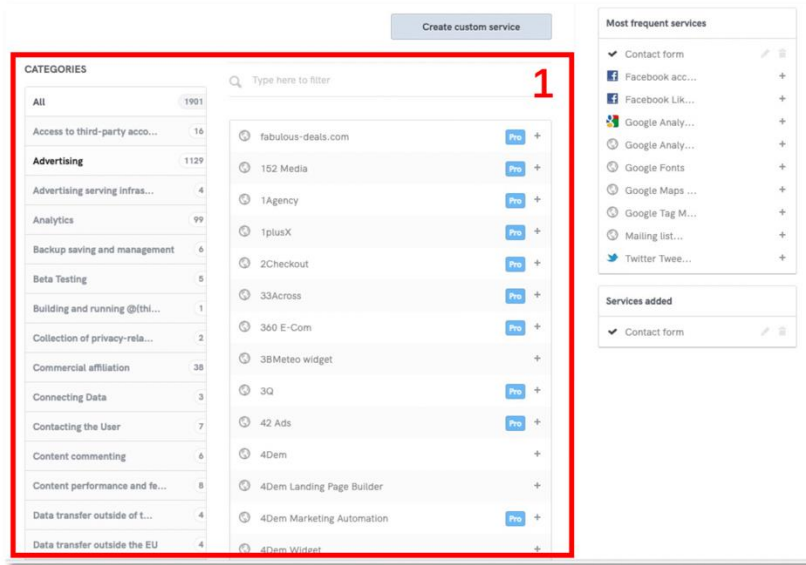


Data Collection

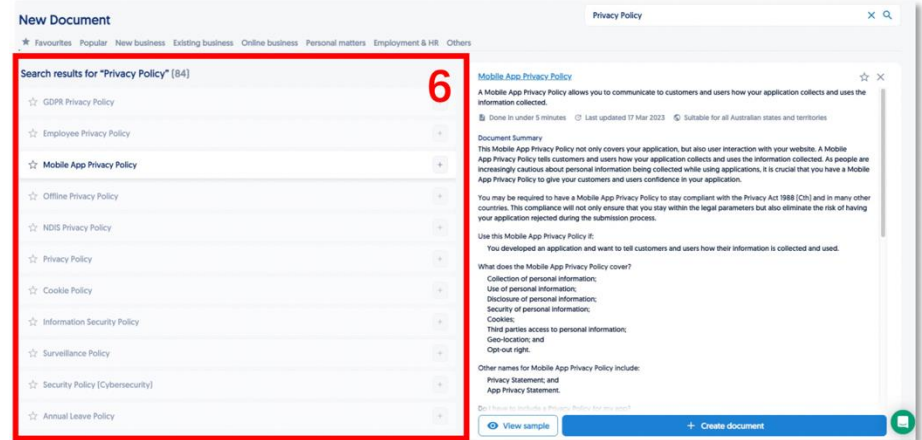
Data Processing

Data Analysis

# RQ1: The Characterization of APPGs



UI-mode



Document-mode

# RQ1: The Characterization of APPGs

Table 2: The characterization of 10 APPGs on 10 different dimensions.

# and APPG Name	Extent of Data Use	Customizability	User Instruction	Complexity	Publishing Support	GDPR	CCPA	LGPD	Multilingual Support	Readability
#1 Iubenda	●	◐	●	●	●	●	●	●	●	○
#2 App Privacy Policy Generator	◐	○	○	○	◐	○	○	○	○	●
#3 Termly	●	◐	●	●	●	●	●	○	○	●
#4 Privacy Policies	◐	○	○	◐	●	●	●	○	○	○
#5 App Privacy Policy	○	○	○	○	●	○	○	○	○	◐
#6 Privacy Policy Online	○	○	○	○	●	○	○	○	○	◐
#7 Terms Feed	◐	◐	○	◐	●	●	●	○	○	○
#8 Website Policies	●	●	◐	●	●	●	●	○	○	○
#9 Free Privacy Policy	◐	○	○	◐	●	●	●	○	○	○
#10 Lawpath	○	○	●	○	◐	○	○	○	○	◐

○: low level / does not support; ◐: intermediate level / partially support; ●: high level / fully support

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						GDPR	CCPA	LGPD		
#1 Iubenda	●	◐	●	●	●	●	●	●	●	○
#2 App Privacy Policy Generator	◐	○	○	○	◐	○	○	○	○	●
#3 Termly	●	◐	●	●	●	●	●	○	○	●
#4 Privacy Policies	◐	○	○	◐	●	●	●	○	○	○
#5 App Privacy Policy	○	○	○	○	●	○	○	○	○	◐
#6 Privacy Policy Online	○	○	○	○	●	○	○	○	○	◐
#7 Terms Feed	◐	◐	○	◐	●	●	●	○	○	○
#8 Website Policies	●	●	◐	●	●	●	●	○	○	○
#9 Free Privacy Policy	◐	○	○	◐	●	●	●	○	○	○
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#2 App Privacy Policy Generator	◐	○	○	○	◐	○	○	○	○	●
#3 Termly	●	◐	●	●	●	●	●	○	○	●
#4 Privacy Policies	◐	○	○	◐	●	●	●	○	○	○
#5 App Privacy Policy	○	○	○	○	●	○	○	○	○	◐
#6 Privacy Policy Online	○	○	○	○	●	○	○	○	○	◐
#7 Terms Feed	◐	◐	○	◐	●	●	●	○	○	○
#8 Website Policies	●	●	◐	●	●	●	●	○	○	○
#9 Free Privacy Policy	◐	○	○	◐	●	●	●	○	○	○
#10 Lawpath	○	○	●	○	◐	○	○	○	○	◐

○: low level / does not support; ◐: intermediate level / partially support; ●: high level / fully support



# RQ1: The Characterization of APPGs

App's basic information	1	2	3	4	5	6	7	8	9	10
Name of the app	●	●	●	●	●	●	●	●	●	●
Name of the developer	●	●	●	●	○	○	●	●	●	●
State/Country of the developer	○	○	●	●	●	●	○	○	●	●
Physical address of the developer	●	●	●	●	○	○	●	●	●	●
Email address of the developer	●	●	●	●	●	●	●	●	●	●
Phone number of the developer	○	●	●	●	○	○	●	○	○	○
Customizable policy effective date	●	●	●	○	○	○	○	○	○	●
Users' personal information	1	2	3	4	5	6	7	8	9	10
Users' general personal information										
Name	●	●	●	●	○	○	●	●	●	○
Age group* (adulthood or underage)	●	○	●	○	○	○	○	●	○	○
Phone numbers	●	●	●	●	○	○	●	●	●	○
Email address	●	●	●	●	○	○	●	●	●	○
Residential addresses	●	●	●	●	○	○	●	○	●	○
Users' sensitive personal information										
Health data	●	○	●	○	○	○	○	●	○	○
Biometric data	●	○	●	○	○	○	○	●	○	○
Gender data	●	○	●	○	○	○	○	○	○	○
Information revealing race or ethnic origin	○	○	●	○	○	○	○	●	○	○
Government identifiers (e.g., medical card number)	●	○	●	○	○	○	○	●	○	○

Device permissions	1	2	3	4	5	6	7	8	9	10
Calendar permission	●	○	●	○	○	○	○	○	○	○
Camera permission	●	○	●	●	○	○	●	●	●	○
Contacts permission	●	○	●	○	○	○	○	●	○	○
Location permission	●	○	●	●	○	○	●	●	●	○
Microphone permission	●	○	●	○	○	○	○	○	○	○
Phone permission	●	○	●	○	○	○	○	○	○	○
Sensor permission	●	○	●	○	○	○	○	○	○	○
SMS permission	●	○	●	○	○	○	○	○	○	○
Storage permission	●	○	●	○	○	○	○	○	○	○
Selected third-party services	1	2	3	4	5	6	7	8	9	10
Facebook account access	●	●	●	○	○	○	○	●	○	○
Twitter account access	●	○	●	○	○	○	○	●	○	○
Google Analytics for Firebase	●	●	●	○	○	○	●	●	●	○
Flurry Analytics	●	●	●	●	○	●	●	●	●	○
AdMob	●	●	●	●	○	●	●	●	●	○
Statistic summary	1	2	3	4	5	6	7	8	9	10
Minimum multiple-choice questions	/	4	58	7	2	5	7	38	7	/
Maximum multiple-choice questions	/	5	79	26	2	5	26	63	26	/
Minimum completion questions	/	4	11	2	2	3	2	2	2	/
Maximum completion questions	/	4	76	22	2	3	22	13	22	/

The breakdown of APPG's recognition of data use.



# RQ2: The Prevalence of APPGs in Market

Table 4: Summary of market use of different APPGs.

Method	Market Occupancy
Fingerprint Keyword Searching	6.6% (3,066)
Document Similarity Comparison	18.1% (8,425)
Intersection	4.4% (2,042)
<b>Union (Total)</b>	<b>20.1% (9,332)</b>

The market occupancy ratio of 10 examined APPGs is around **20.1%**!

<https://www.termsfeed.com/live/e4dcca9a-552d-4fb5-be2a-b4a37967d077>

## Fingerprint Keyword Searching

### Contact Us

If you have any questions about this Privacy Policy, You can contact us:

- By email: 123

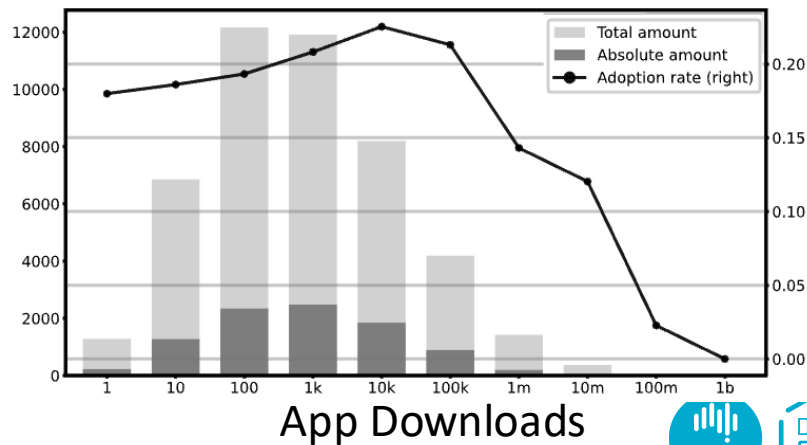
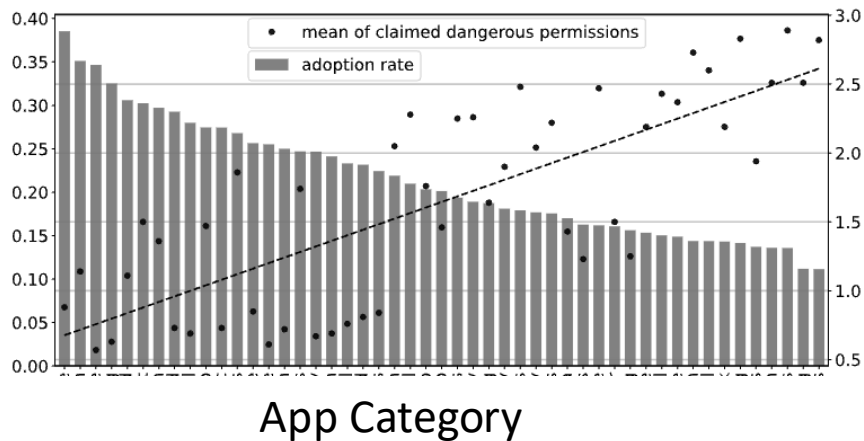
Generated using [TermsFeed](#) Privacy Policy Generator

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# RQ3: The Compliance of APPGs against Regulations

Table 6: Tallies of the APPGs' compliance against legal requirements in privacy regulations. The individual requirements of LGPD are shown in Table 5. "N.R." stands for "no record". The enforcement date of LGPD is September 2020.

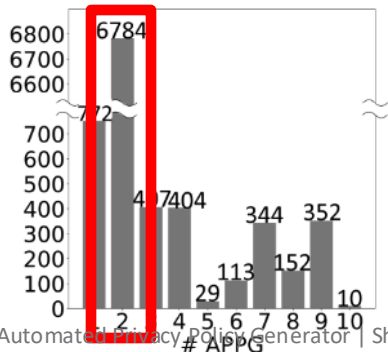
#	GDPR			CCPA			LGPD
	May'20	Jan'21	May'22	May'20	Jan'21	May'22	May'22
1	8/8	8/8	8/8	14/18	14/18	14/18	8/8
2	N.R.	N.R.	3/8	N.R.	N.R.	3/18	3/8
3	8/8	8/8	8/8	3/18	15/18	15/18	6/8
4	8/8	8/8	8/8	5/18	16/18	16/18	6/8
5	N.R.	N.R.	0/8	N.R.	N.R.	2/18	1/8
6	N.R.	N.R.	0/8	N.R.	N.R.	2/18	1/8
7	8/8	8/8	8/8	5/18	16/18	16/18	6/8
8	N.R.	N.R.	8/8	N.R.	N.R.	11/18	5/8
9	8/8	8/8	8/8	5/18	16/18	16/18	6/8
10	N.R.	N.R.	2/8	N.R.	N.R.	2/18	4/8

Table 7: The disclosure existence of seven fundamental data rights. Numbers in the first row indicate APPGs as per Table 1, and "Apps" denotes the tallies of disclosure for 12 leading apps.

Data Right	1	2	3	4	5	6	7	8	9	10	Apps
Right to Know	X	✓	✓	X	X	✓	✓	✓	✓	✓	12/12
Right to Access	X	✓	✓	X	X	✓	✓	✓	✓	✓	12/12
Right to Processing	X	✓	✓	X	X	✓	✓	✓	X	✓	12/12
Right to Restrict of Processing	X	✓	✓	X	X	✓	✓	✓	X	✓	12/12
Right to be Forgotten	X	✓	✓	X	X	✓	✓	✓	✓	✓	12/12
Right to Data Transfer	X	✓	✓	X	X	✓	✓	✓	X	✓	12/12
Right to Lodge a Complaint	X	✓	✓	X	X	✓	✓	✓	✓	✓	12/12

Table 8: The disclosure existence of five highly concerning privacy practices. Numbers in the first row indicate APPGs as per Table 1, and "Apps" denotes the tallies of disclosure for 12 leading apps.

Privacy Practice	1	2	3	4	5	6	7	8	9	10	Apps
Data Encryption	✓	✓	✓	✓	X	X	✓	✓	✓	✓	8/12
Government Requests	✓	X	✓	✓	X	X	✓	✓	✓	X	11/12
Data Breach Notification	X	X	✓	X	X	X	X	✓	X	X	1/12
Changes Notification	✓	X	✓	✓	X	X	✓	✓	✓	X	12/12



The #2 App Privacy Policy Generator is the most popular one, boasting a 72.7% adoption rate. Users tend to select easy-to-use APPGs even though at the cost of a potentially-higher risk to breach privacy regulations.



# Conclusions – Automated Privacy Policy Generators (APPG)

1. **[Usability]** APPGs are a handy solution for developers to draft privacy policies for their apps. They have various features and characterizations.
2. **[Market Penetration]** The market occupancy ratio of 10 examined APPGs is around 20.1%. Users tend to select easy-to-use APPGs even though at the cost of a potentially-higher risk to breach privacy regulations.
3. **[Noncompliance]** Noncompliance with privacy laws and under-claiming issues indicate potential need for a more stringent evaluation of APPGs' capabilities.
4. **[APPG Mode]** Questionnaire mode can better guide users to include claimed device permissions compared to UI mode.
5. **[Privacy Policy Contradiction]** More privacy policy contradiction issues exist in APPG-based privacy policies.

# Implications and Findings to Stakeholders



- **App developers/APPG users:** While app developers may benefit from using APPGs to create privacy policies more efficiently, they should be aware of APPGs' latent limitations.



- **APPG providers:** Our analysis suggests APPG providers should work on improving recognised data use, since the majority of APPGs on the market only provide a very limited scope of personal information and device permissions.



- **Privacy regulators:** Regulators should recognize the importance of this issue and be engage with this emerging market trend.



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## Thanks for your listening!



Scan for full paper

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