

WhatsApp Global Usage Data Analysis

1 Project Overview

Recent research by IT-Security experts from the University of Vienna and SBA Research identified a massive privacy vulnerability in WhatsApp's contact discovery mechanism, which could enumerate **3.5 billion accounts across 236 countries**. This study exposed metadata like operating systems, profile pictures, statuses, and the number of linked companion devices, without accessing message content. The findings demonstrate that even limited metadata can reveal population-level and individual insights about privacy behavior and platform adoption.

Our dataset captures **WhatsApp account statistics by country**, including adoption, platform type, privacy behavior, business usage, and companion devices.

Original Columns:

Country | Accounts | Global Share | Accounts Per 100 Capita | Android | iOS
| Picture | Status | Business | Companions

2 Data Cleaning & Feature Engineering

- Standardized column names to lowercase and underscores for consistency.
 - Converted `accounts` to integer type after removing commas.
 - Addressed missing values in `accounts_per_100_capita` for small territories.
 - Added a `continent` column using `pycountry_convert` for regional analysis.
 - Exported the cleaned and featured dataset: `featured_data.csv`.
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3 Exploratory Data Analysis (EDA)

3.1 Top Countries by WhatsApp Penetration (Per 100 People)

Country	Accounts per 100 Capita
Monaco	480.01
United Arab Emirates	175.67
Sint Maarten (Dutch part)	142.74
Qatar	141.51
Cayman Islands	138.78

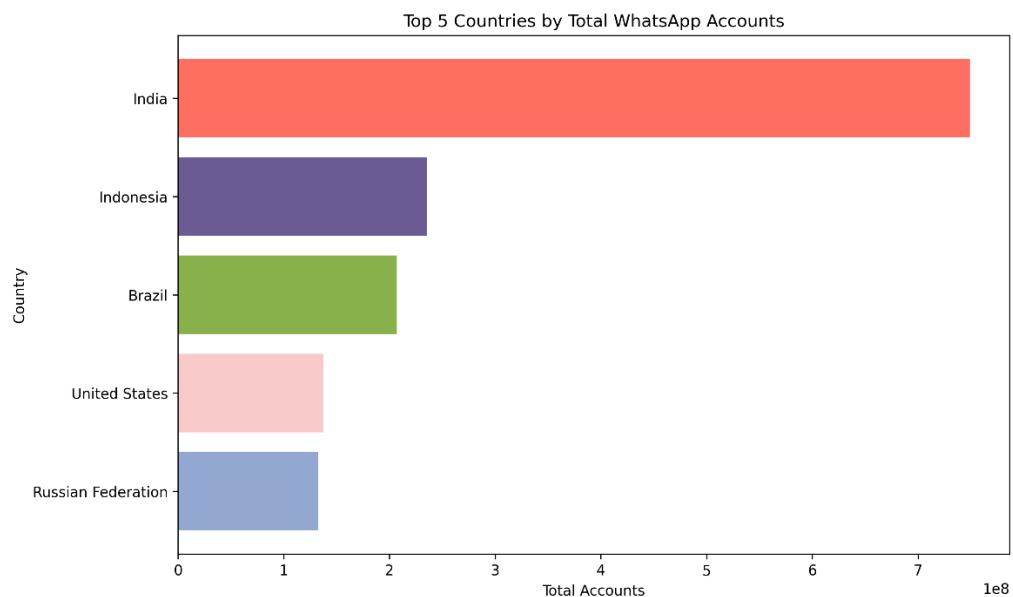
3.2 Companion Devices & Platform Correlation

- Android vs companions: **-0.33** (slightly negative)
- iOS vs companions: **0.33** (slightly positive)

Suggests iOS users are slightly more likely to use multiple devices.

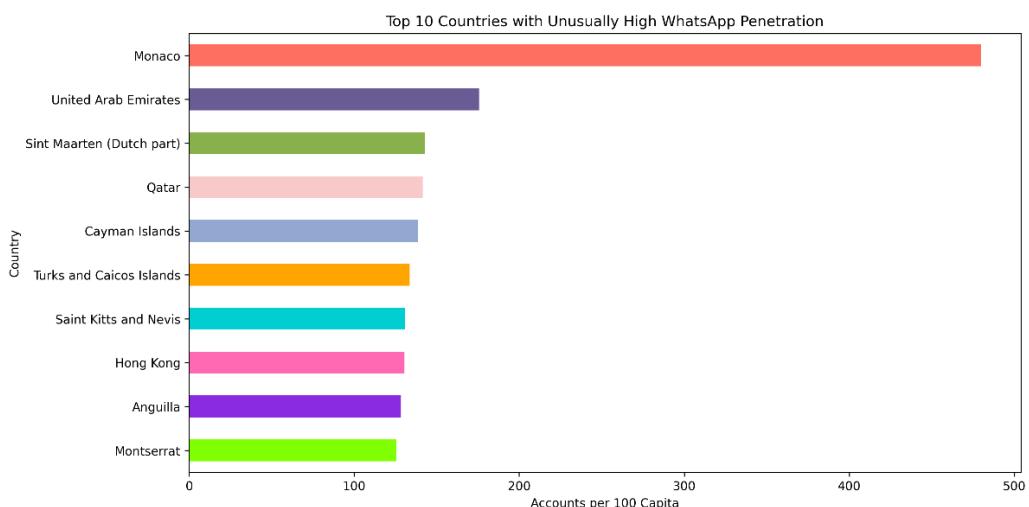
3.3 Top Countries by Total Accounts

Country	Total Accounts	Global Share
India	749,075,246	21.67
Indonesia	235,245,077	6.81
Brazil	206,949,224	5.99
United States	137,859,284	3.99
Russian Federation	132,855,022	3.84



3.4 Unusually High WhatsApp Penetration

Top 10 countries with highest per-capita adoption include Monaco, UAE, Sint Maarten, Qatar, and Cayman Islands. These are often **small territories or islands** with near-universal adoption.

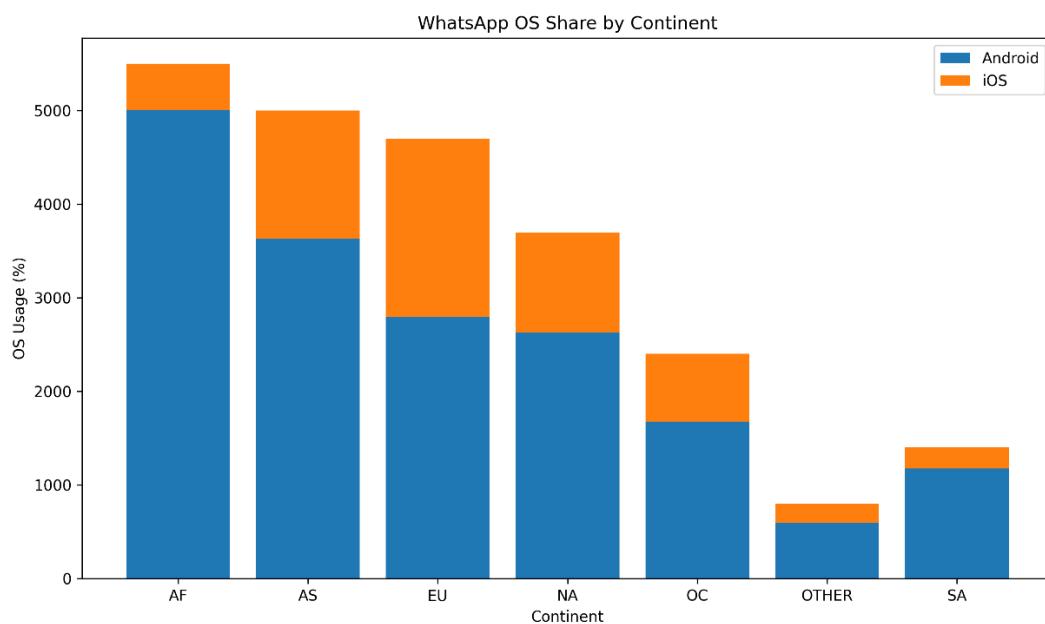


3.5 OS Usage by Continent

Continent Android Usage iOS Usage

Continent	Android Usage	iOS Usage
AF	5009.19	490.81
AS	3631.34	1368.66
EU	2793.11	1906.89
NA	2628.81	1071.19
OC	1676.29	723.71
OTHER	596.60	203.40
SA	1175.00	225.00

Android dominates globally (81%), iOS usage is concentrated in EU and NA. Rare iOS-dominant countries/continents were also identified.



3.6 Privacy Behavior by Region

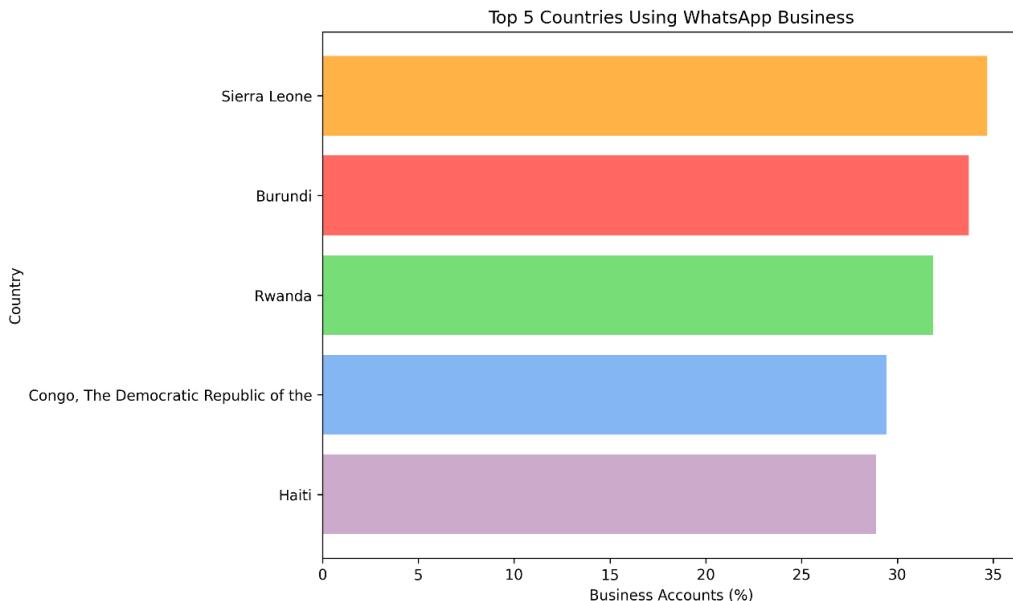
Continent Picture Usage Status Usage

Continent	Picture Usage	Status Usage
AF	3635.10	997.96
AS	2668.93	1229.72
EU	2556.43	1676.70
NA	1880.42	1025.91
OC	1161.45	406.66
OTHER	461.00	199.99
SA	726.63	390.46

EU and NA users share more profile information; AF and SA are more private on average.

3.7 WhatsApp Business Usage

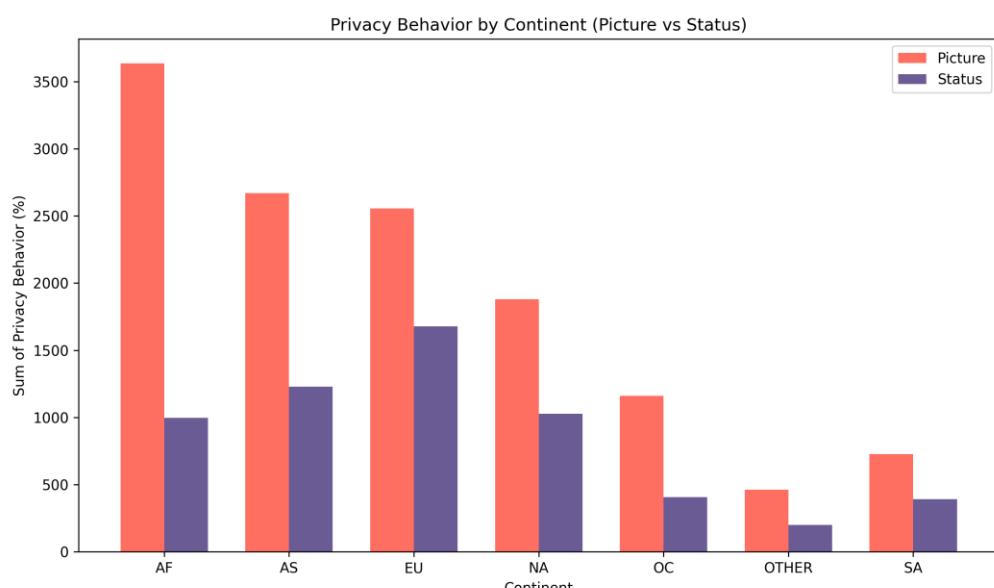
Top 5 countries using WhatsApp Business most: Sierra Leone, Burundi, Rwanda, DR Congo, and Haiti.



3.8 Privacy Behavior by Continents

Metric	Large Countries	Small Countries
Avg Picture Visibility	54.46	55.96
Avg Status Visibility	29.31	24.38

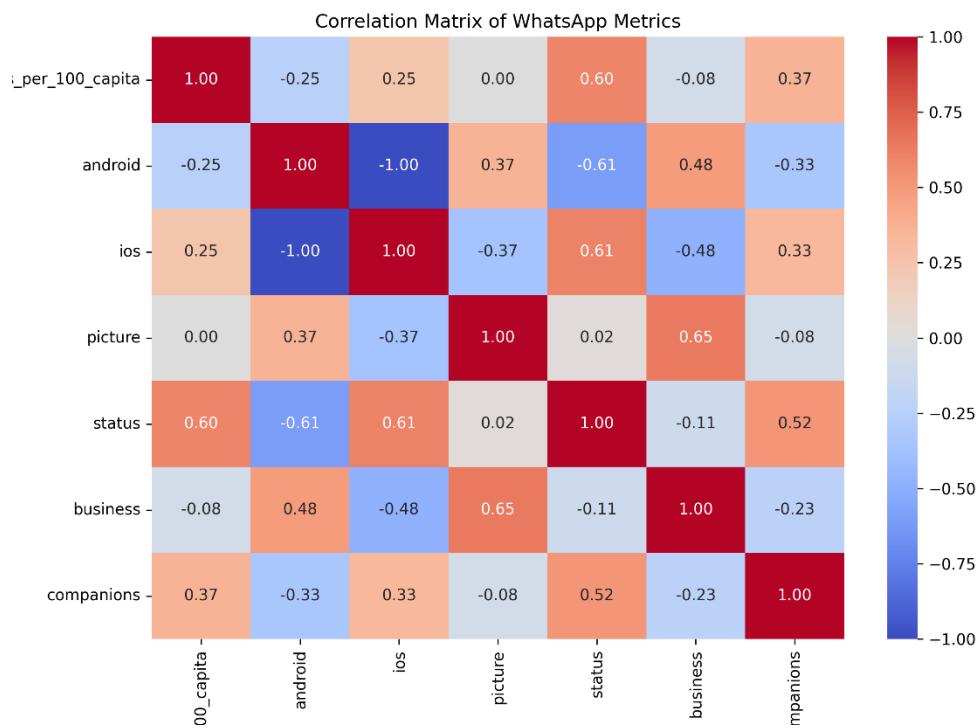
Large continents are slightly less privacy-conscious on average in terms of profile visibility.



3.9 Correlation Matrix Analysis

Analyzed correlations between numeric metrics:
accounts_per_100_capita, android, ios, picture, status, business, companions.

- Strong **negative correlation** between Android and iOS (as expected).
- Positive correlation between profile visibility (picture and status) and penetration—higher adoption often links to more shared info.
- Weak correlation between business accounts and companions, showing multi-device usage trends.



4 Outliers and Anomalies

- **Small Islands (<1M accounts, >100 per capita):** Monaco, Sint Maarten, Cayman Islands, Turks & Caicos, Saint Kitts & Nevis.
- **iOS-dominant continents (rare):** North America, Europe.
- **Extremely high companions (>50):** North Korea.

5 Key Insights

1. **India dominates global WhatsApp usage**, but per-capita penetration is modest.
2. **Small territories** like Monaco show almost universal adoption.
3. **Android dominates globally**, but EU & NA have stronger iOS presence.

4. **Privacy behavior varies regionally;** EU/NA are slightly less private than AF/SA.
 5. **Business accounts and companion devices** are concentrated in specific countries, showing organizational adoption patterns.
 6. Metadata analysis can reveal global usage trends and privacy behaviors even without message content.
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6 Conclusion

This analysis highlights how global WhatsApp adoption patterns differ by population size, geography, device type, and privacy practices. Even limited metadata, when aggregated, provides powerful insights into user behavior and regional patterns. The case study demonstrates the value of **data analysis on security and privacy datasets**, producing actionable insights and visuals for portfolio showcase.