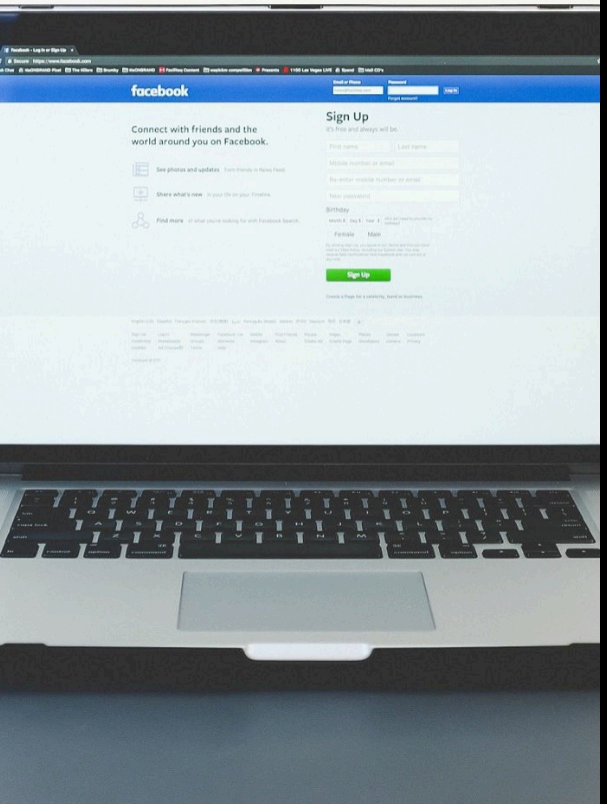


Does Facebook use sensitive data for advertising purposes?

JOSÉ GONZÁLEZ CABAÑAS

José González Cabañas

PhD student - Universidad Carlos III de Madrid

@ jgcabana@it.uc3m.es

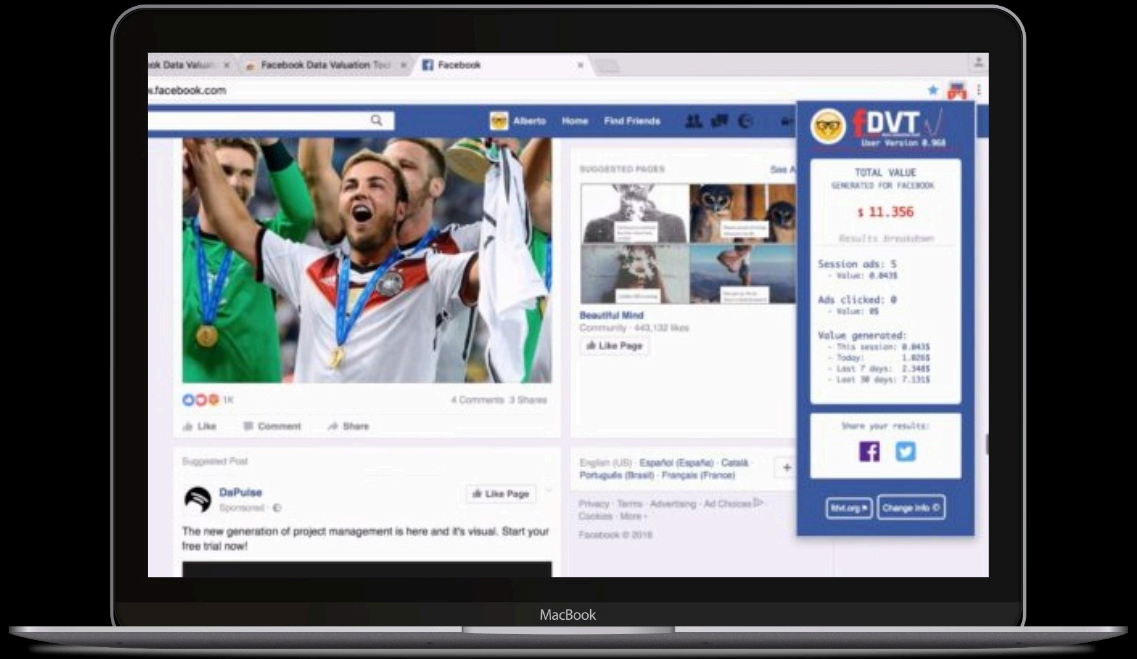
jgcabana

https://it.uc3m.es/jgcabana

@joseegc_

Online Advertising
Privacy
Internet Measurements
Social Networks

FDVT



WEBSITE

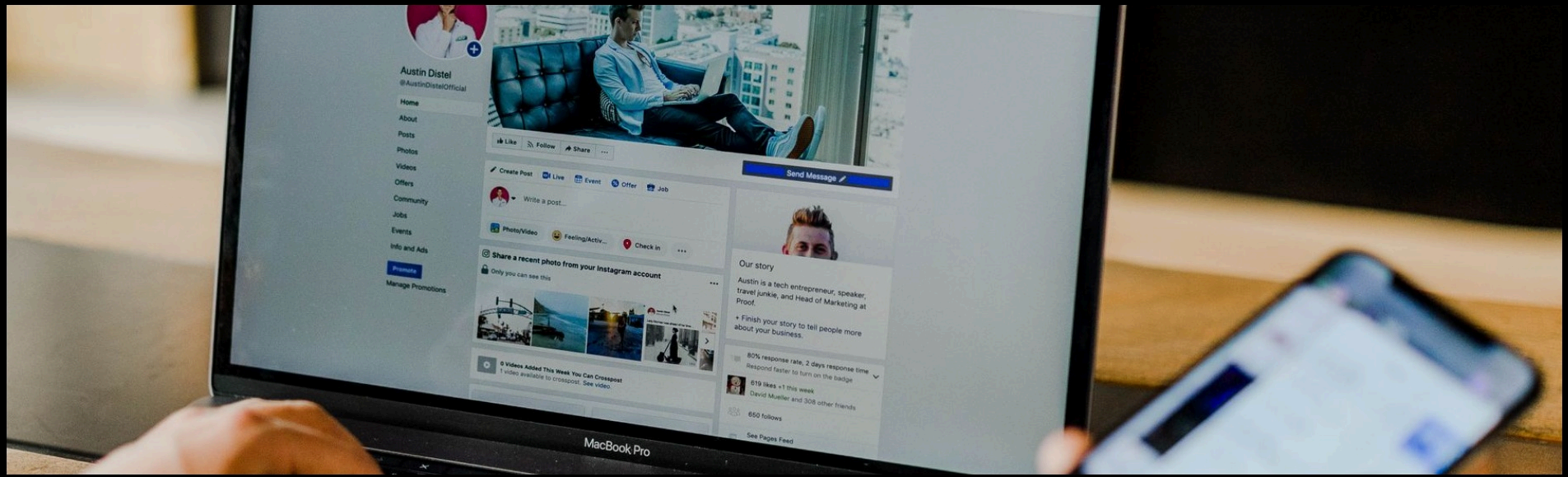
https://fdvt.org

CHROME PLUGIN

https://chrome.google.com/webstore/detail/fdvt-social-network-data/blednbbpnnambjaefhlocghajeohlhmh

FIREFOX ADDON

https://addons.mozilla.org/es/firefox/addon/fdvt/



Introduction

HOW DOES ONLINE ADVERTISING WORK?

The use of online services

FREE

The use of online services

ADS

The use of online services

ADS

The use of online services

ADS

Introduction

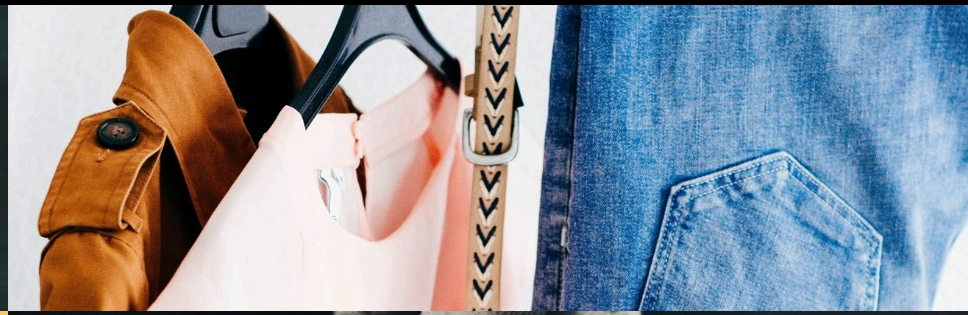
The use of online services

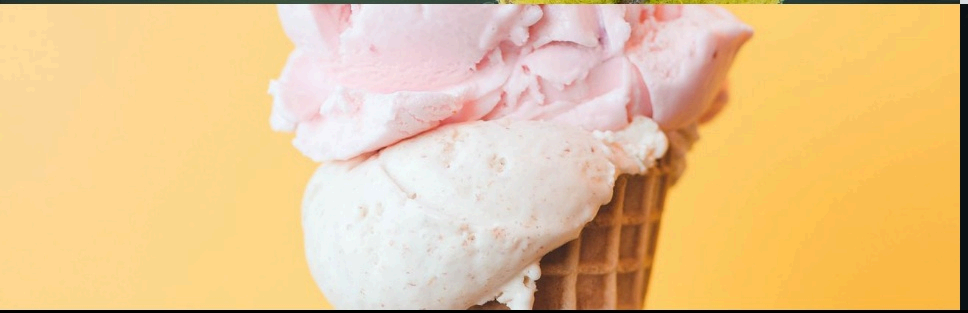
If you are not paying for something

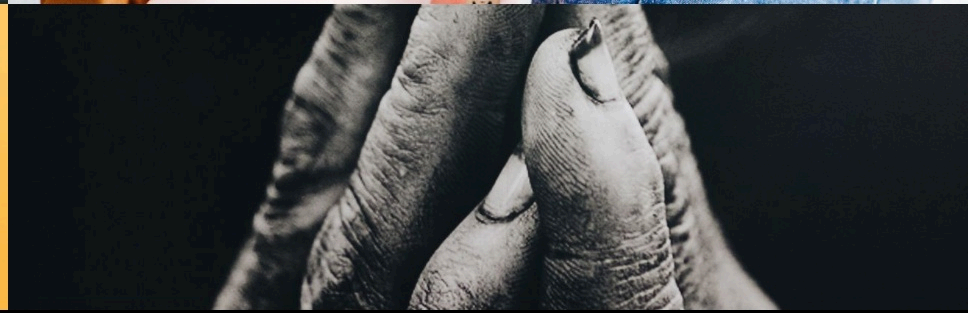
YOU ARE THE PRODUCT

Introduction

Audiences





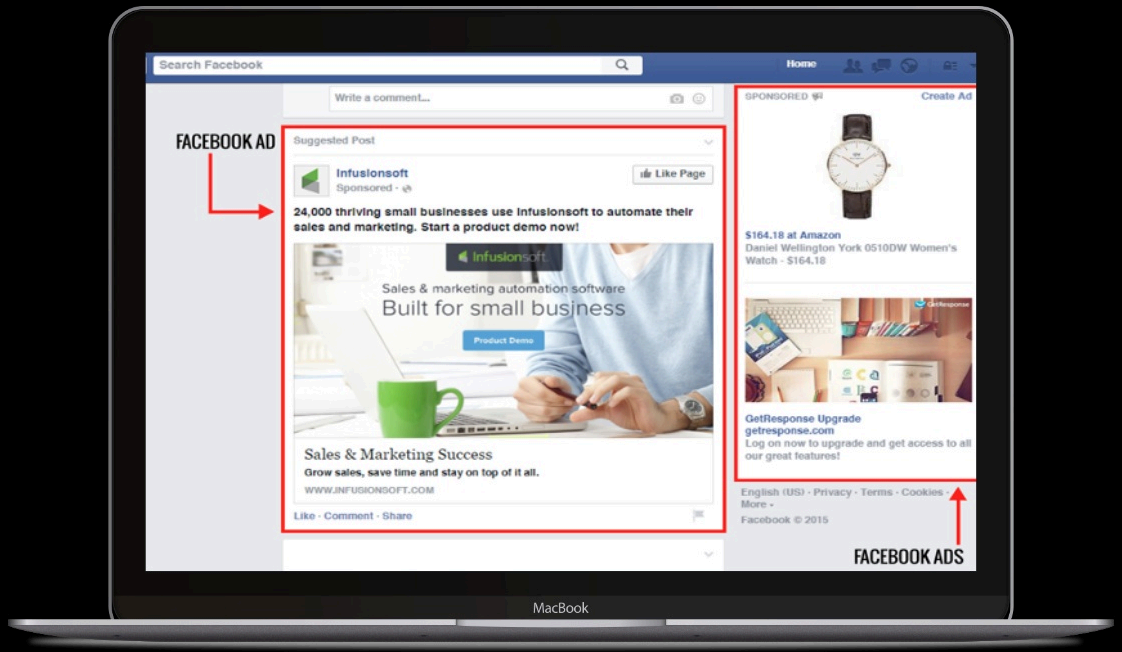


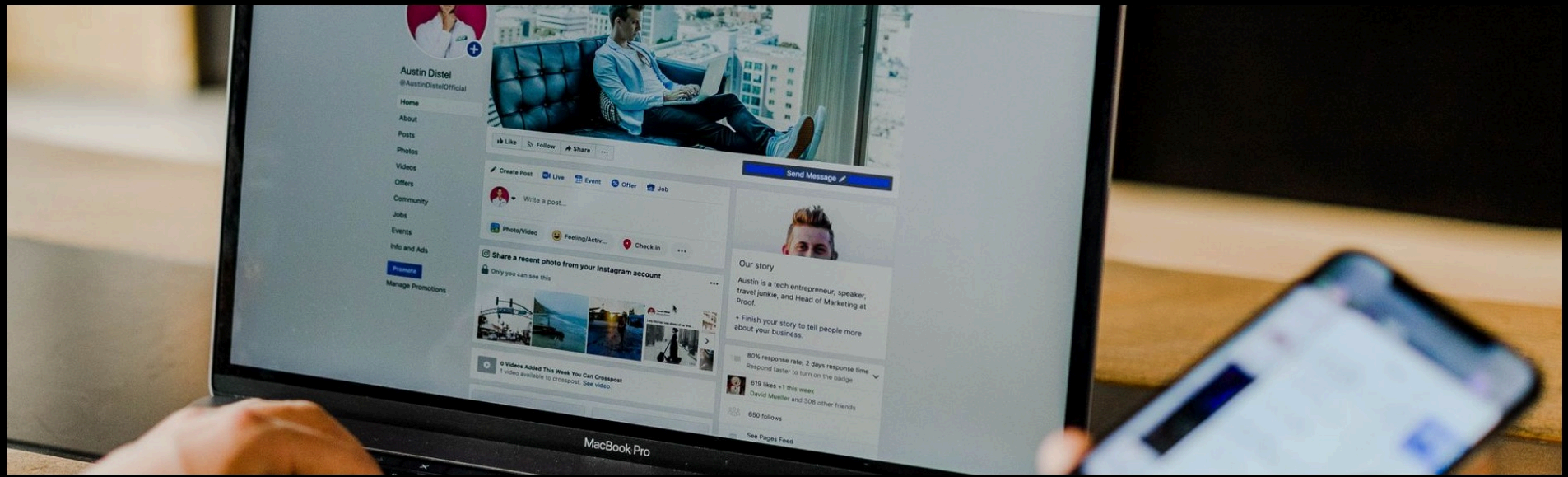
Advertisers define the audiences they want to reach

Auction

And then they bid for you and get to show you their ad

Facebook ads

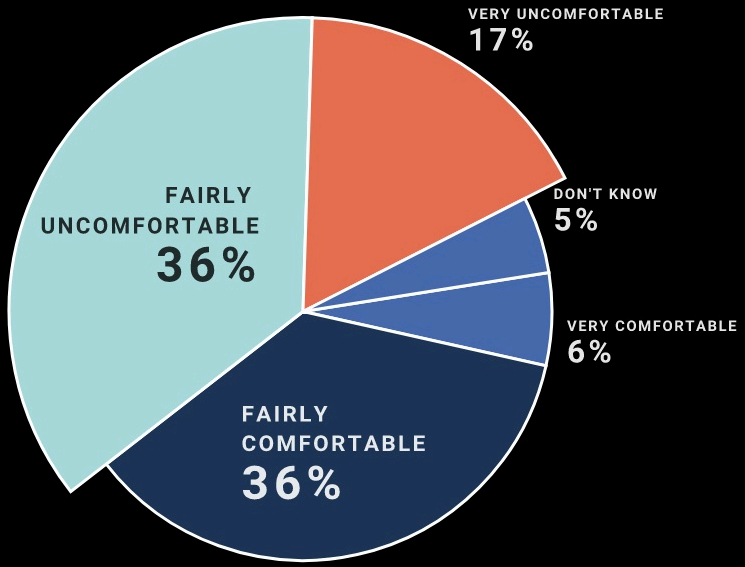




Motivation

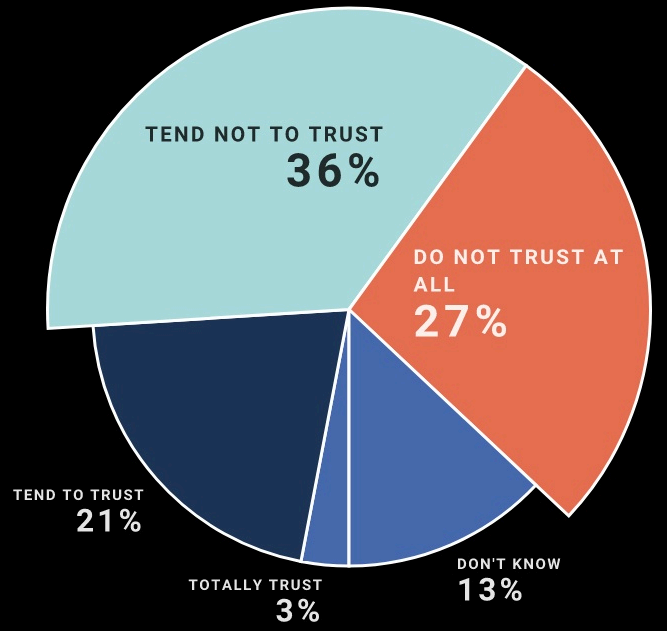
DID YOU KNOW SENSITIVE DATA IS USED IN THIS PROCESS?

Concerns among citizens



How comfortable are you with online businesses using your personal information to show you ads and relevant content?

Do you trust online businesses?



Eurobarometer 2015

GDPR

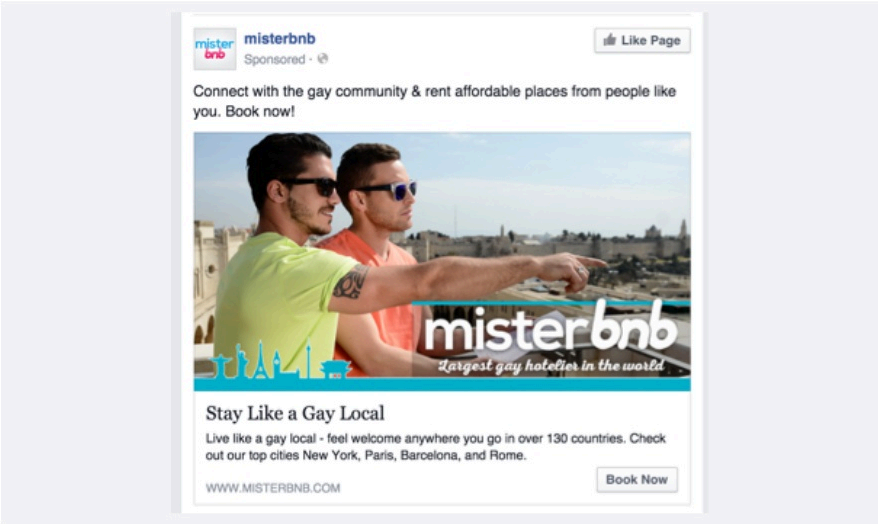
- ETHNIC ORIGIN
- POLITICAL OPINIONS
- RELIGIOUS OR PHILOSOPHICAL BELIEFS
- DATA CONCERNING HEALTH
- DATA CONCERNING SEXUAL ORIENTATION

Article 9 GDPR regulates Sensitive Data use

"Processing of personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation shall be prohibited"

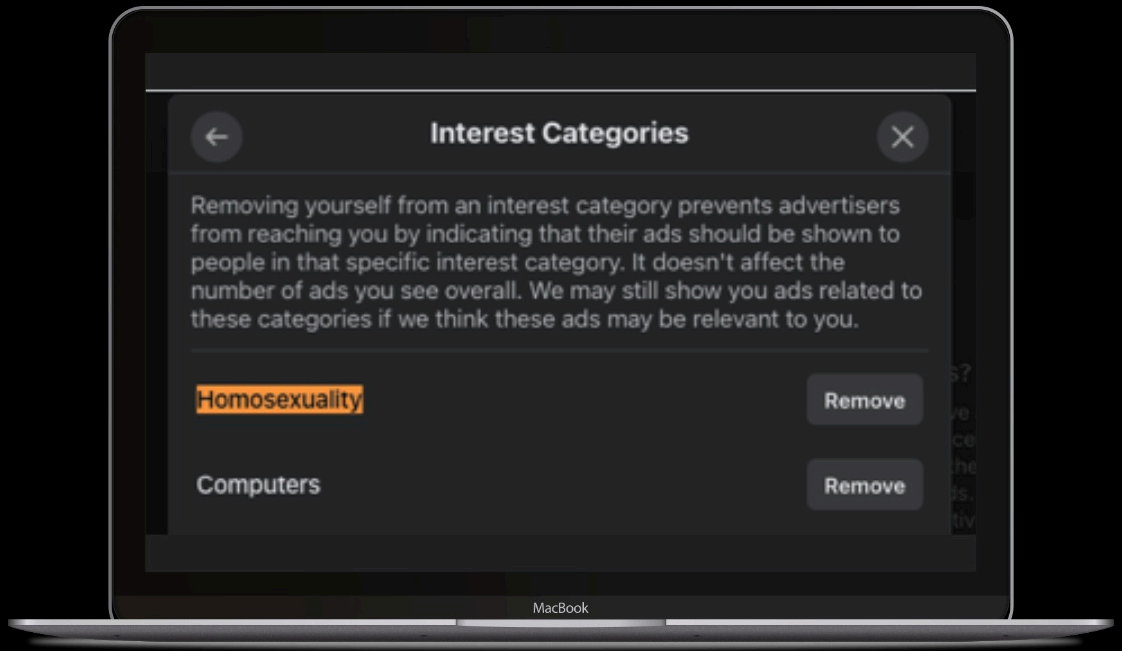
Motivation

Sensitive ads



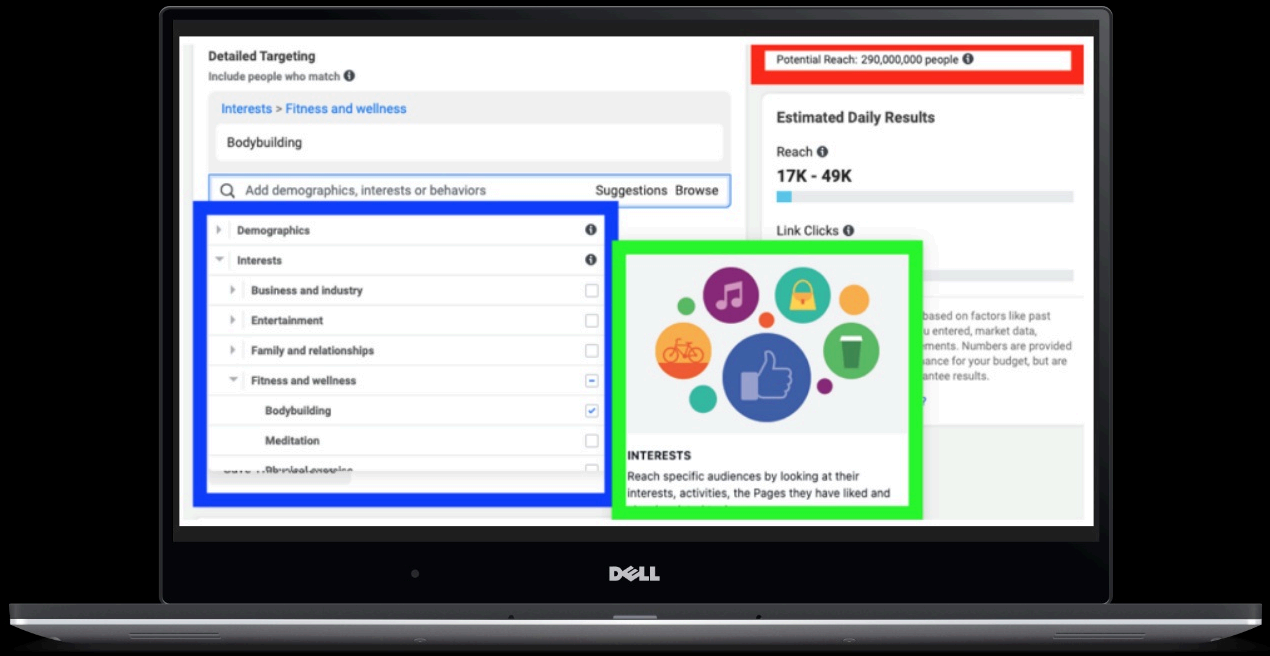
HOW MANY PEOPLE ARE ASSIGNED WITH SENSITIVE PERSONAL INFORMATION IN THE CONTEXT OF THE GDPR DEFINITION OF SENSITIVE DATA ON FACEBOOK?

Facebook ad preferences



https://facebook.com/ads/preferences

Facebook ads manager



Use of sensitive data

FACEBOOK MISUSE OF PERSONAL INFORMATION

Use of sensitive data for advertising

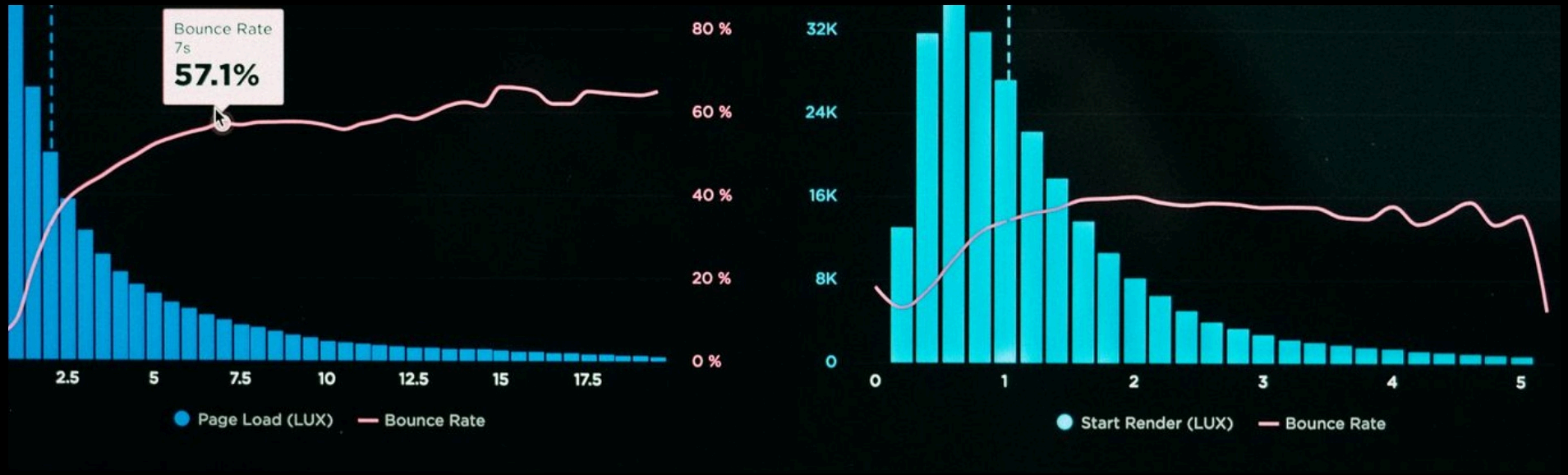
Facebook fined

FRENCH DPA FINED FB €150K IN MAY. 2017 (BEFORE GDPR)

"Collect sensitive data of the users without obtaining their explicit consent. Indeed, no specific information on the sensitive nature of the data is provided to users when they complete their profiles with such data"

SPANISH DPA FINED FB €1.2M IN SEP. 2017 (BEFORE GDPR)

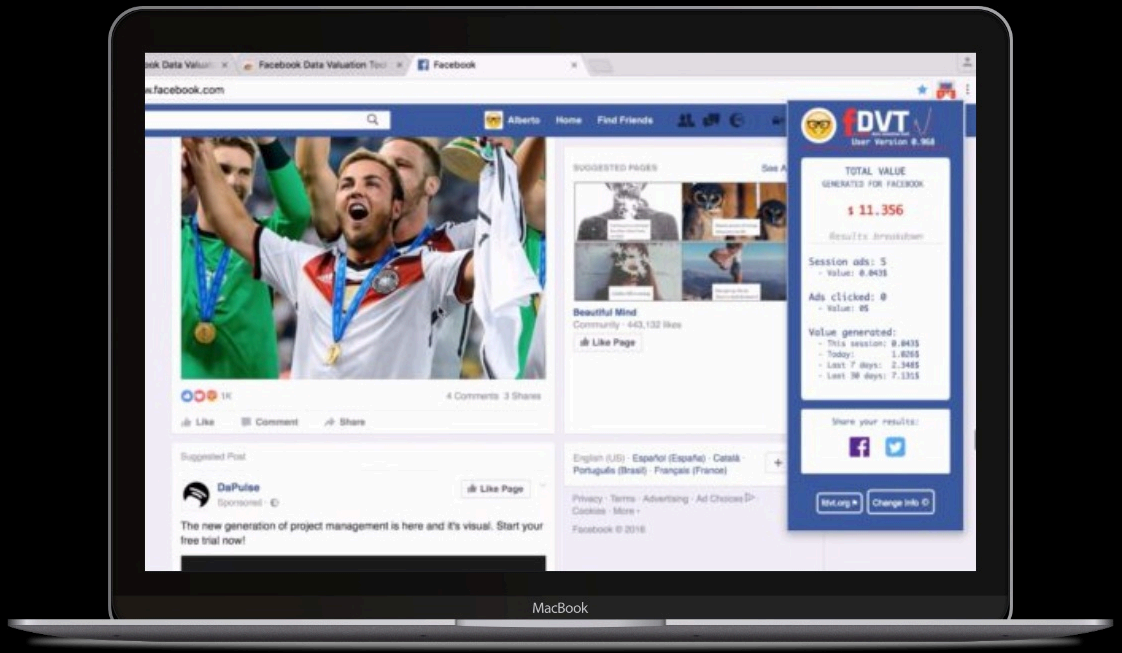
"The data on ideology, sex, religious beliefs, personal preferences or browsing activity are collected directly, through interaction with their services or from third party pages without clearly informing the user about how and for what purpose will use those data. Facebook does not obtain unambiguous, specific and informed consent from users to process their data since the information it offers is not adequate"



Data methodology

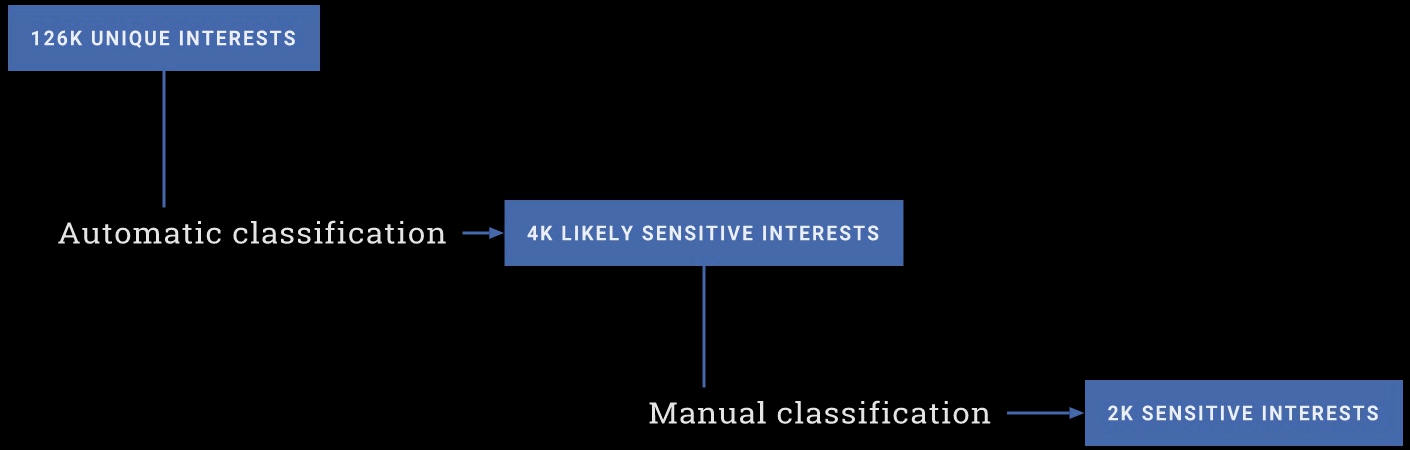
DID YOU KNOW SENSITIVE DATA IS USED IN THIS PROCESS?

Dataset



- 4577 USERS
- 5.5M INTERESTS
- 126K INTERESTS UNIQUE

Identification of sensitive interests



Requests to Facebook

How many users in a given country are interested in ad preference 1 OR ad preference 2 OR ad preference 3... OR ad preference N

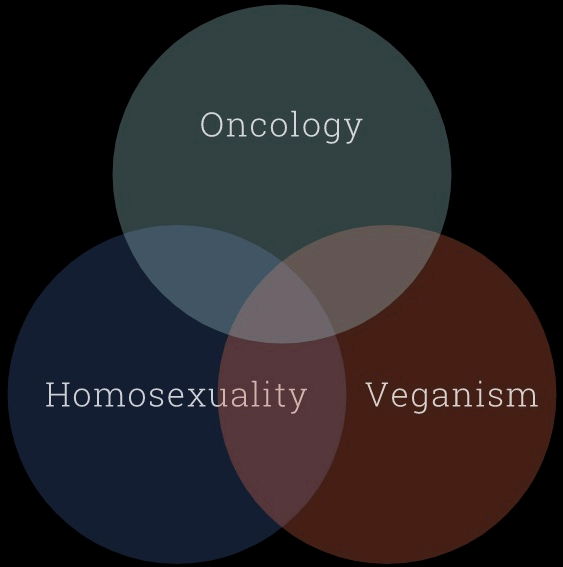
How many people in

France

are interested in

Homosexuality OR Oncology OR Veganism OR ...

Requests to Facebook



FB API Maximum N = 1000 interests

Requests to Facebook

FFB(Country, Number of interests in the query)

FFB(France, 1000 most popular sensitive interests)

197 country codes

Results

Q1: HOW MANY PEOPLE ARE LABELED WITH SENSITIVE INTERESTS WORLDWIDE?

Q1: How many people are assigned with sensitive interests?

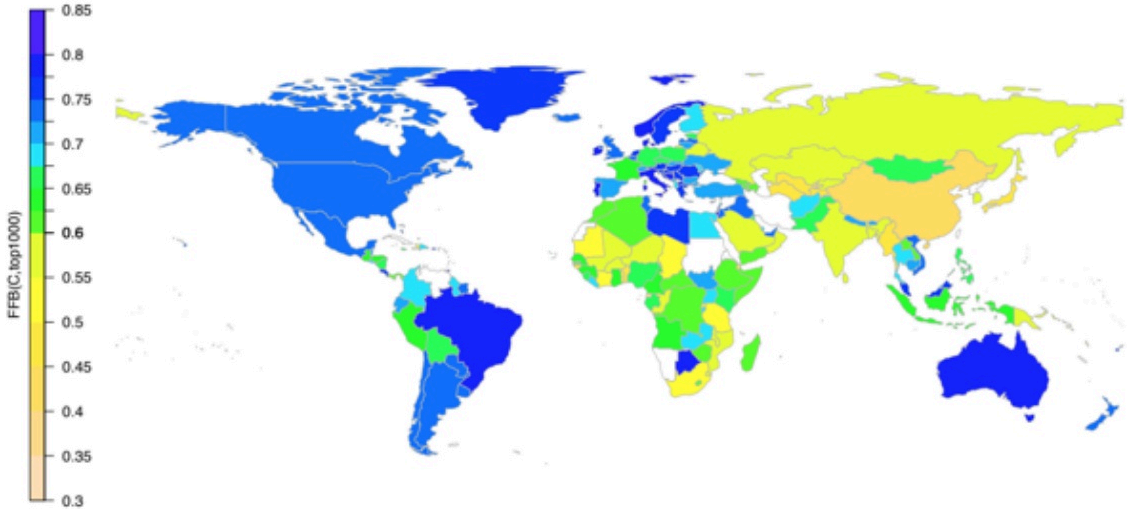


Figure 2: Choropleth map of the number of FB users assigned potentially sensitive ad preferences (FFB(C,1000)) for the 197 countries analyzed in the paper.

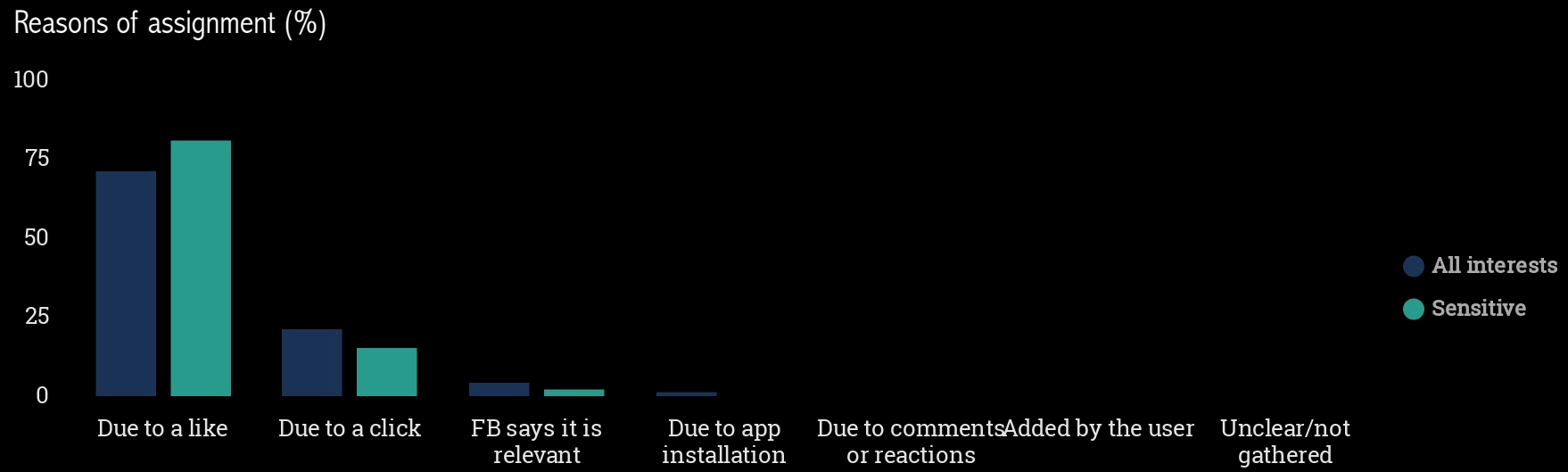
67% OF FB USERS ARE ASSIGNED WITH SOME POTENTIALLY SENSITIVE INTEREST
22% OF CITIZENS ARE ASSIGNED WITH SOME POTENTIALLY SENSITIVE INTEREST

Q1: How many people are assigned with sensitive interests?

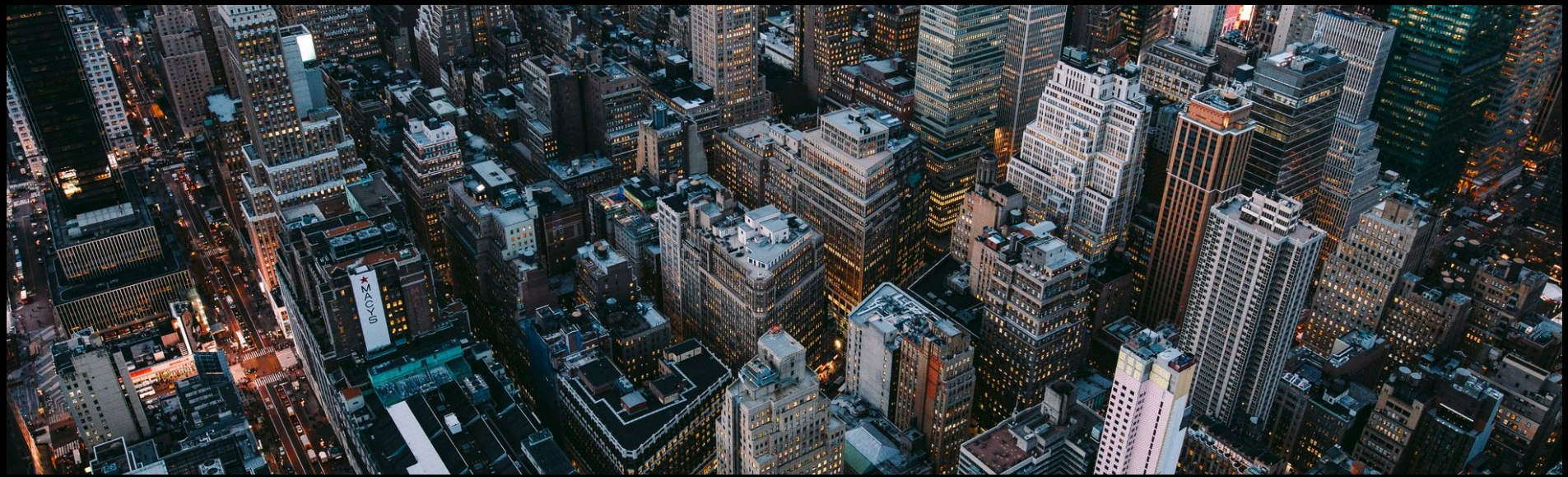
- **MOST IMPACTED: MALTA (82% OF FB USERS)**
- **LEAST IMPACTED: EQUATORIAL GUINEA (37% FB USERS)**

Results

Q1: How many people are assigned with sensitive interests?



VERY FEW CASES (0.03%) IN WHICH USERS PROACTIVELY INCLUDE POTENTIALLY SENSITIVE INTERESTS IN THEIR LIST OF AD PREFERENCES



Results

Q2: ARE DEVELOPED COUNTRIES MORE EXPOSED TO SENSITIVE INTERESTS?

Q2: Are developed countries more exposed to sensitive interests?

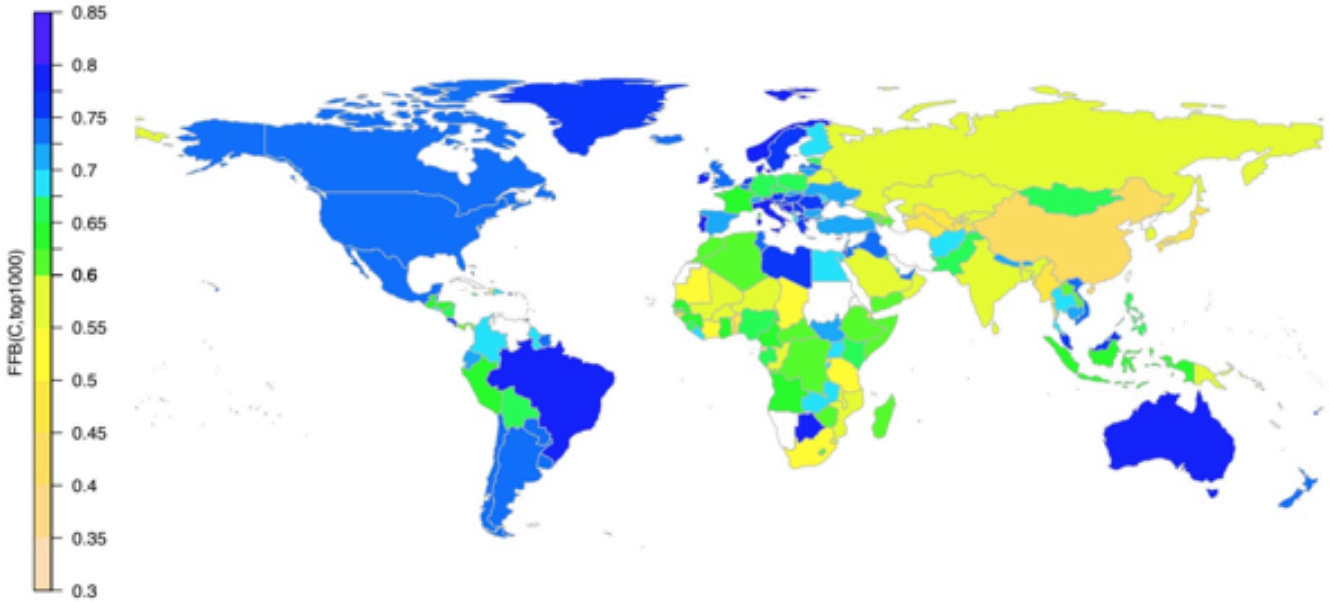


Figure 2: Choropleth map of the number of FB users assigned potentially sensitive ad preferences (FFB(C,1000)) for the 197 countries analyzed in the paper.

Q2: Are developed countries more exposed to sensitive interests?

Indicators

- FB PENETRATION
- VOICE AND ACCOUNTABILITY
- GDP PER CAPITA
- ACCESS TO A MOBILE PHONE OR INTERNET AT HOME
- EXPECTED YEARS OF SCHOOL
- BIRTH RATE

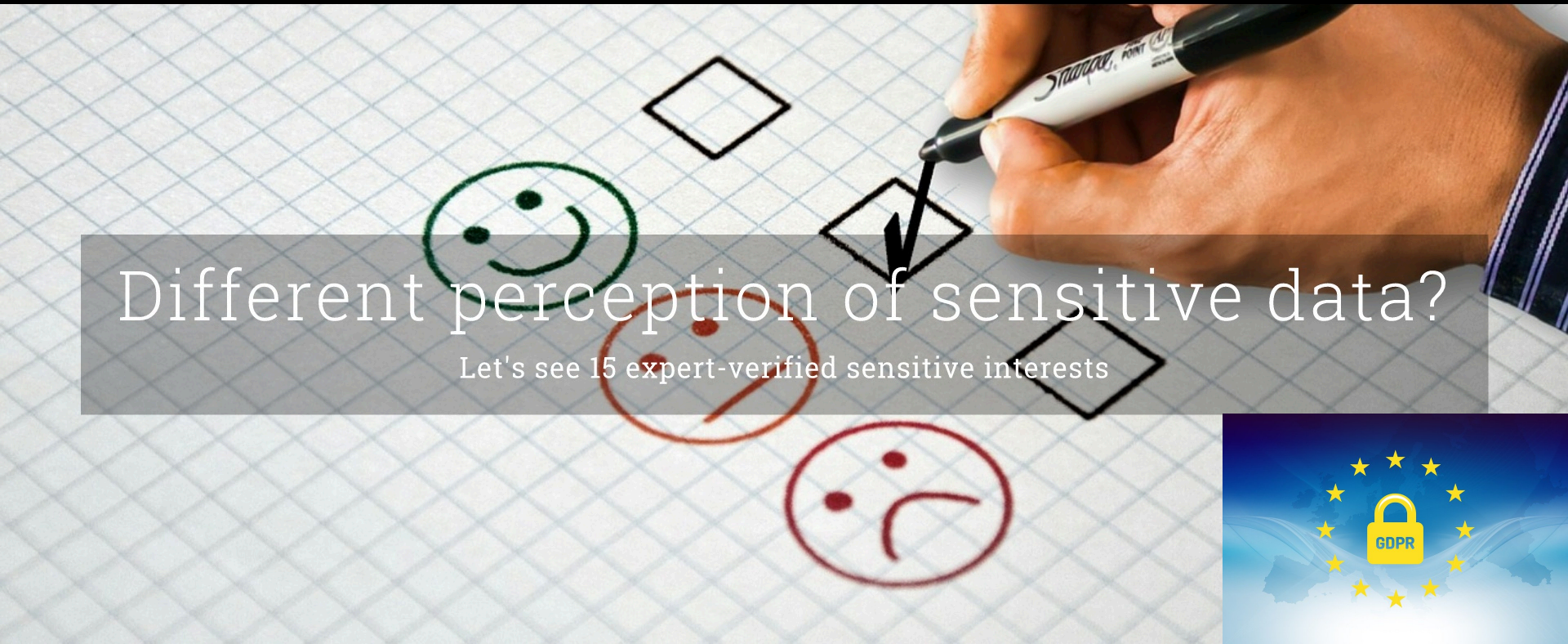
Q2: Are developed countries more exposed to sensitive interests?

	Correlation FFB country	p value	
FB penetration	0.544	2.2e-16	
Expected years of school	0.444	7.249e-09	
Access to a mobile phone or Internet at home	0.395	1.478e-06	
GDP per capita	0.381	5.733e-08	
Voice and accountability	0.372	1.142e-07	
Birth rate	-0.455	4.922e-11	

Results

Q3: EXPOSURE TO EXPERT VERIFIED SENSITIVE INTERESTS?

Q3: Exposure to expert verified sensitive interests?



Different perception of sensitive data?

Let's see 15 expert-verified sensitive interests

Q3: Exposure to expert verified sensitive interests?

ad preference	Africa	America	Asia	Europe	Oceania	World
ALTERNATIVE MEDICINE	3.40	11.35	3.27	7.17	10.82	6.26
BIBLE	13.28	14.65	6.31	8.13	14.61	9.68
BUDDHISM	2.87	5.38	10.36	4.13	7.19	7.23
FEMINISM	3.22	9.27	2.08	6.52	10.84	5.01
GENDER IDENTITY	0.08	0.46	0.07	0.20	0.60	0.21
HOMOSEXUALITY	2.66	7.93	2.27	6.07	8.48	4.57
ILLEGAL IMMIGRATION	0.26	0.15	0.02	0.03	0.07	0.08
JUDAISM	11.06	3.72	1.91	2.24	2.44	3.33
LGBT COMMUNITY	3.93	13.89	5.39	11.94	14.82	8.79
NATIONALISM	1.82	1.11	1.28	1.32	0.95	1.28
ONCOLOGY	1.30	1.33	0.38	0.84	0.97	0.81
PREGNANCY	11.75	19.17	11.58	17.09	21.41	14.71
REPRODUCTIVE HEALTH	0.36	0.24	0.17	0.07	0.09	0.19
SUICIDE PREVENTION	0.05	0.30	0.03	0.08	1.02	0.13
VEGANISM	5.97	14.18	6.83	16.98	22.78	10.61
UNION	30.43	40.66	27.62	38.25	46.92	33.45

Table 2: Percentage of FB users (FFB) within Africa, America, Asia, Europe and Oceania assigned some sensitive ad preferences from a list of 15 expert-verified sensitive ad preferences as non-GDPR compliant. Last column "World" shows FFB for the aggregation of all 197 considered countries. Last row shows the result for the 15 ad preferences aggregated.

33% OF FB USERS ARE LABELED WITH SOME OF THE 15 VERIFIED SENSITIVE AD PREF

Results

Q4: HAS THE GDPR HAD ANY IMPACT ON THE USE OF SENSITIVE DATA?

Q4: Has the GDPR had any impact on the use of sensitive data?

- **AD PREFERENCES APPEAR AND DISAPPEAR**

  However, we do not know if it has to do with the GDPR or not

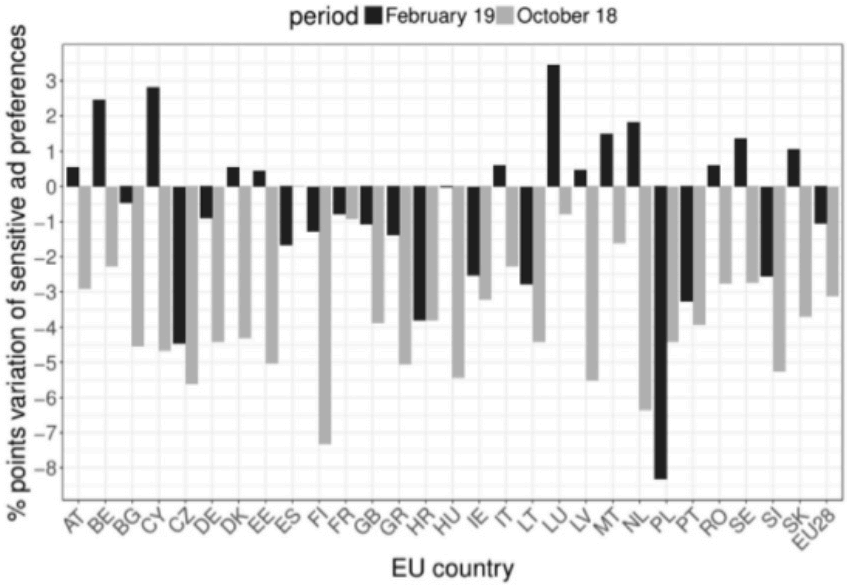
- **19 SENSITIVE WERE REMOVED IN OCTOBER 2018**

- **25 WERE REMOVED IN FEBRUARY 2019**

- **5 FROM THE EXPERT-VERIFIED SENSITIVE AD PREFERENCES**

  Communism, Islam, Quran, Socialism, and Christianity

Q4: Has the GDPR had any impact on the use of sensitive data?



THE GDPR HAD NEGLIGIBLE IMPACT ON THE ASSIGNATION OF SENSITIVE AD PREFERENCES

Risks

Facebook campaigns

Ad Set Name	Reach	Impressions	Amount Spent	Location (Ad Set Settings)
Religion	7,630	7,985	€5.00 of €5.00	IT, ES, FR and DE
Political	11,025	16,537	€10.00 of €10.00	IT, ES, FR and DE
Sexuality	7,314	7,367	€20.00 of €20.00	IT, ES, FR and DE
Results from 3 ad sets	26,458 People	31,889 Total	€35.00 Total Spent	

CAMPAIGNS

Religion: Islam, Judaism, Christianity, Buddhism

Politics: Communism, Anarchism, Radical feminism, Socialism

Sexuality: Transsexualism, Homosexuality

Examples of malicious usage of sensitive FB interests

- **HATE CAMPAIGNS**

  Example: Neo-Nazi organization targeting people interested in Judaism or Homosexuality

- **IDENTIFICATION ATTACK**

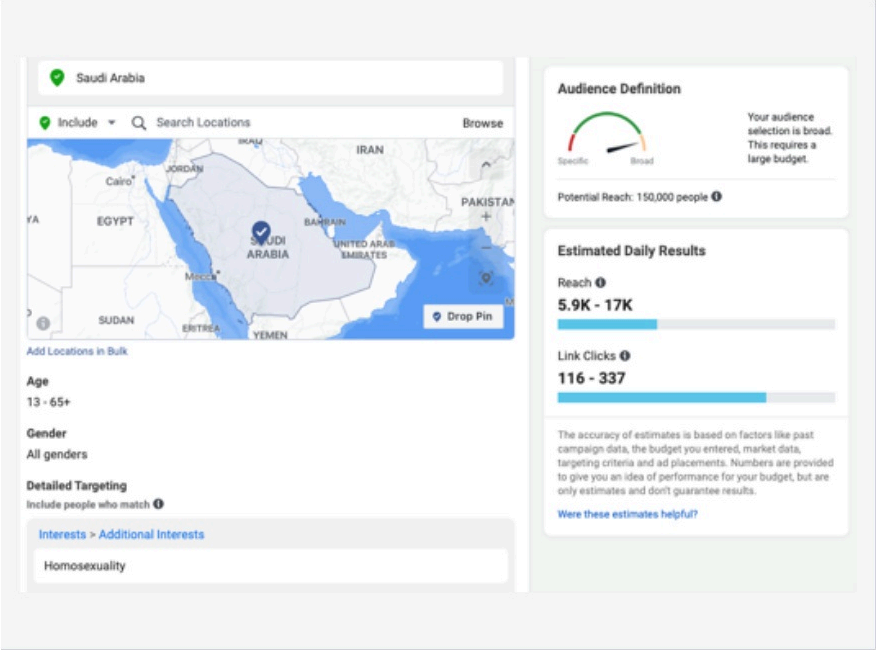
  Example: Phishing-like attack with sexy ads

- **BALL-PARK ESTIMATION COST OF IDENTIFICATION**

  35€ reach 26k users

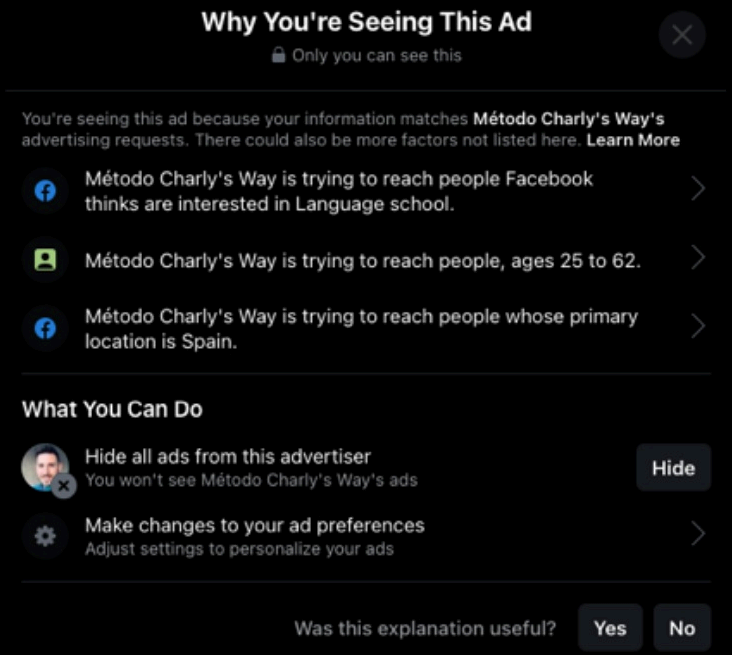
  Attack success rate 9% (from literature)

  €0.015 per user (even with 0.09% cost is €1.5)

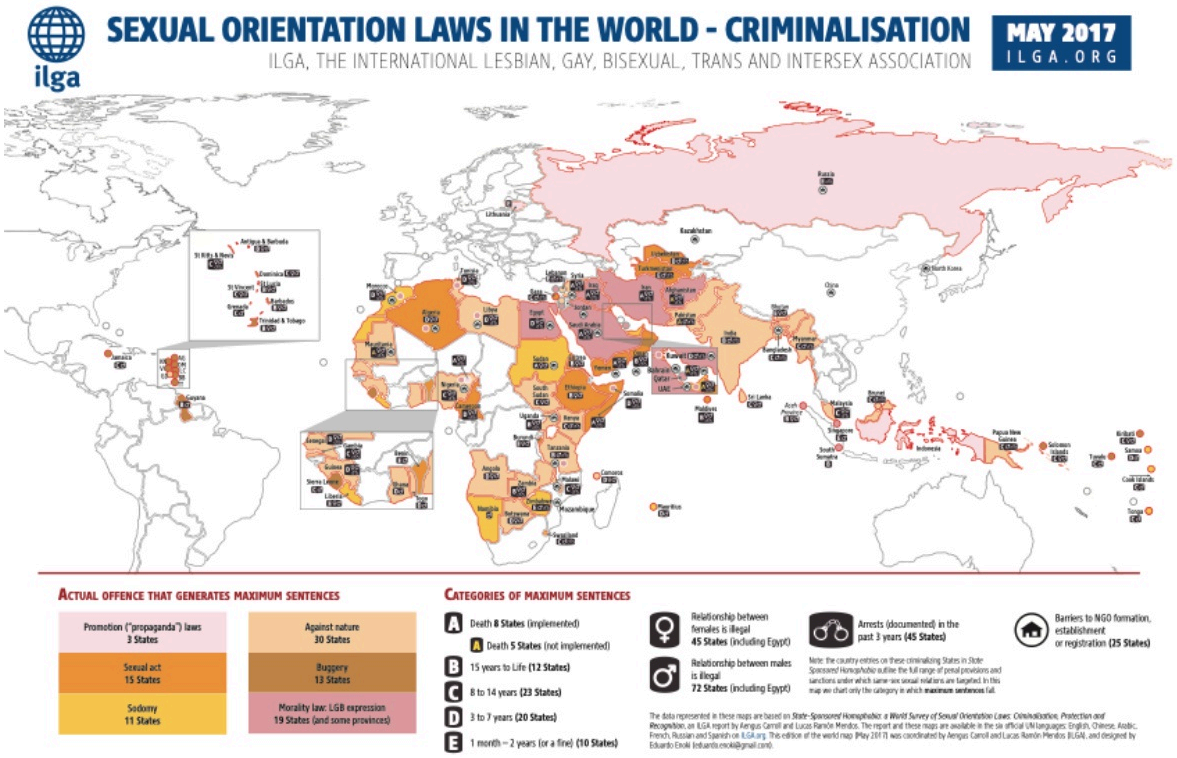


Lure users to phishing attacks

Check information of the ad



World map where certain sexual orientation is penalized



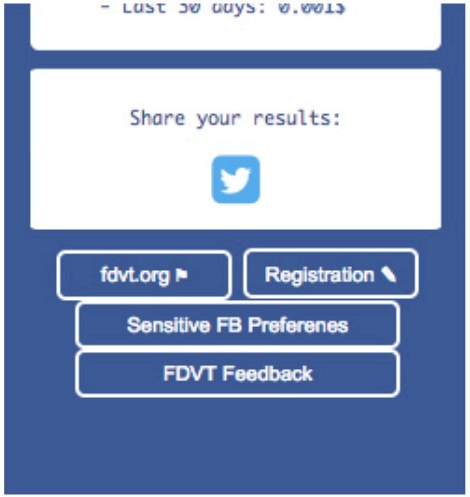
Homosexuality death penalty countries

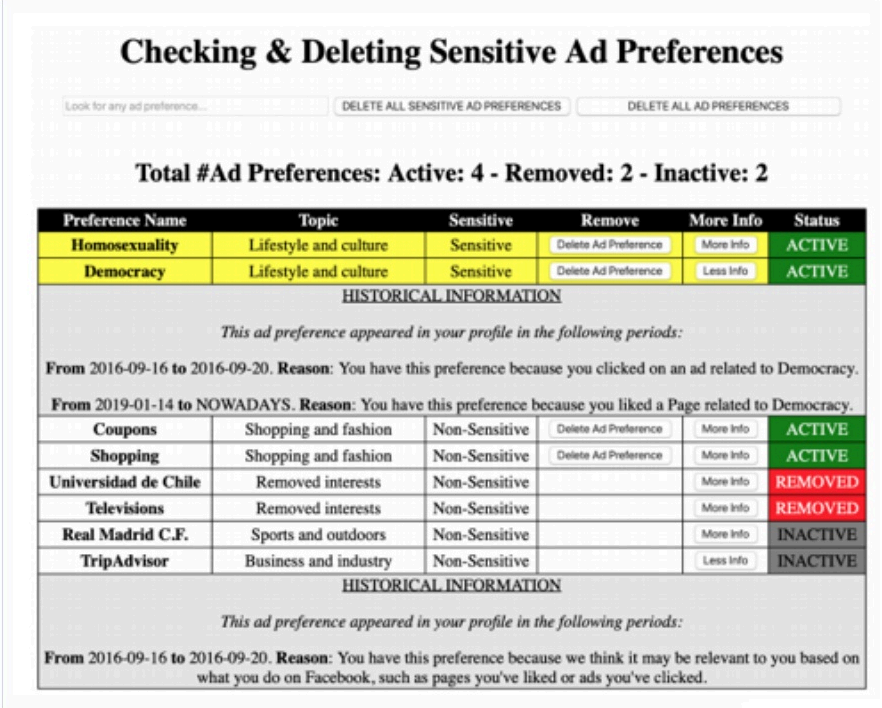
Country	% of FB users tagged with the interests "homosexualilty"
Afghanistan	12.31
Mauritania	0.99
Qatar	2.35
Somalia	1.44
Pakistan	1.54
United Arab Emirates	3.00
Brunei	5.24
Nigeria	2.35
Saudi Arabia	2.08
Yemen	1.08
Iraq	3.20

Solution

Solution

FDVT website





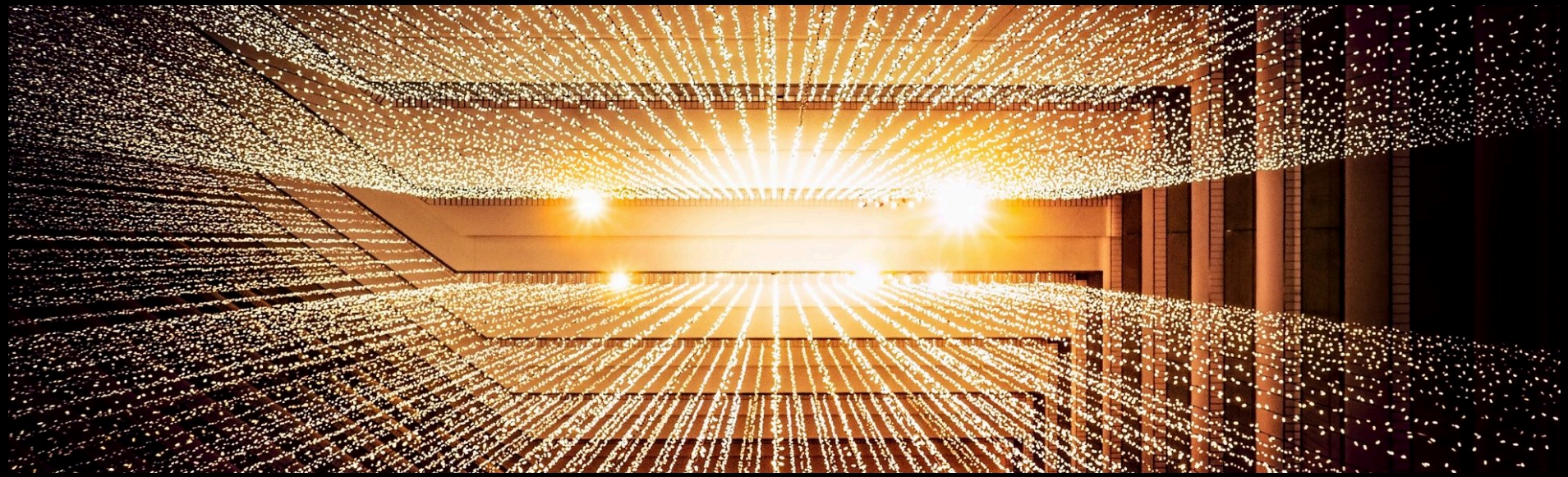
Conclusion

Conclusion

Takeaways

- **FACEBOOK OFFERS ADVERTISERS THE POSSIBILITY TO REACH USERS BASED ON SENSITIVE DATA**
- **67% OF FB USERS WORLDWIDE ARE LABELED WITH SOME POTENTIALLY SENSITIVE AD PREFERENCE**

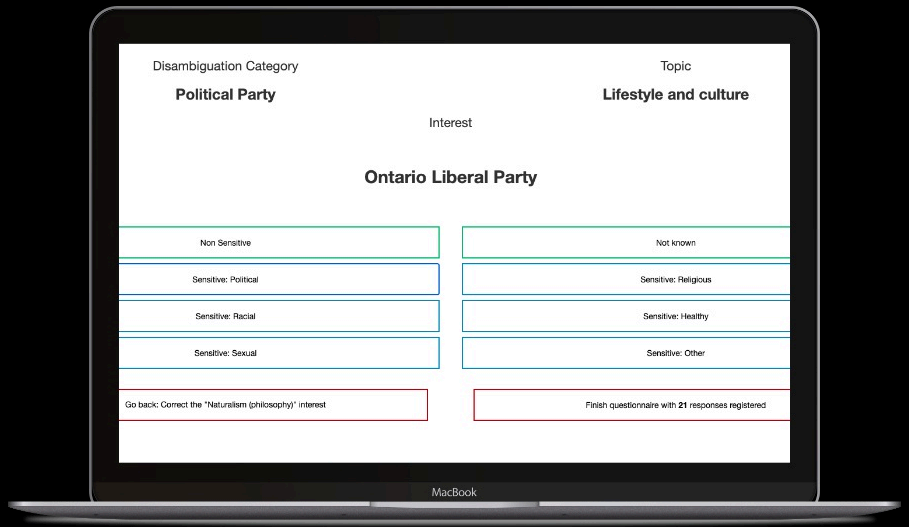
  (22% of citizens)
- **RICH DEVELOPED COUNTRIES ARE MORE EXPOSED TO BEING TAGGED WITH SENSITIVE INTERESTS**
- **GDPR HAS HAD A NEGLIGIBLE IMPACT**



Future work

Future work

Understanding the perspective of sensitive information



REGULAR USERS QUESTIONNAIRE

https://fdvt.org/form_sensitive/user_questionnaire/

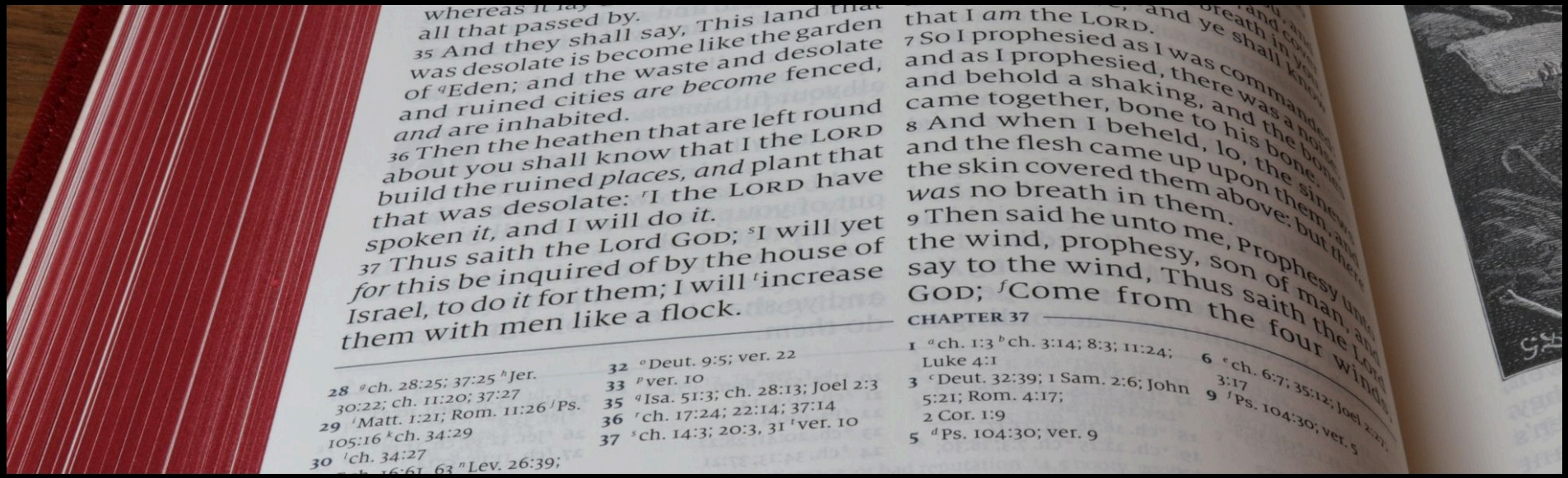
TECHNOLOGY EXPERTS QUESTIONNAIRE

https://fdvt.org/form_sensitive/techs_questionnaire/

LEGAL EXPERTS QUESTIONNAIRE

https://fdvt.org/form_sensitive/lawyers_questionnaire/

PLEASE HELP US IN OUR RESEARCH - KINDLY CLASSIFY 100 INTERESTS - 5 MINUTES OF YOUR TIME


whereas it lay
all that passed by.
35 And they shall say, This land that
was desolate is become like the garden
of [q]Eden; and the waste and desolate
and ruined cities *are become* fenced,
and are inhabited.
36 Then the heathen that are left round
about you shall know that I the LORD
build the ruined *places, and* plant that
that was desolate: [r]I the LORD have
spoken *it*, and I will do *it*.
37 Thus saith the Lord GOD; [s]I will yet
for this be inquired of by the house of
Israel, to do *it* for them; I will [t]increase
them with men like a flock.

28 [g]ch. 28:25; 37:25 [h]Jer. 30:22; ch. 11:20; 37:27
29 [i]Matt. 1:21; Rom. 11:26 [j]Ps. 105:16 [k]ch. 34:29
30 [l]ch. 34:27
[m]ch. 16:61, 63 [n]Lev. 26:39;
32 [o]Deut. 9:5; ver. 22
33 [p]ver. 10
35 [q]Isa. 51:3; ch. 28:13; Joel 2:3
36 [r]ch. 17:24; 22:14; 37:14
37 [s]ch. 14:3; 20:3, 31 [t]ver. 10

that I *am* the LORD.
7 So I prophesied as I was commanded:
and as I prophesied, there was a noise,
and behold a shaking, and the bones
came together, bone to his bone.
8 And when I beheld, lo, the sinews
and the flesh came up upon them, and
the skin covered them above: but there
was no breath in them.
9 Then said he unto me, Prophesy unto
the wind, prophesy, son of man, and
say to the wind, Thus saith the Lord
GOD; [f]Come from the four winds,

CHAPTER 37

1 [a]ch. 1:3 [b]ch. 3:14; 8:3; 11:24; Luke 4:1
3 [c]Deut. 32:39; 1 Sam. 2:6; John 5:21; Rom. 4:17; 2 Cor. 1:9
5 [d]Ps. 104:30; ver. 9
6 [e]ch. 6:7; 35:12; Joel 2:27; 3:17
9 [f]Ps. 104:30; ver. 5

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Submitted work

- **FDVT: DATA VALUATION TOOL FOR FACEBOOK USERS**

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