



# **ACCEPT**

# Acceptable Use of Privacy-Enhancing Technologies

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# University of BRISTOL Our understanding of PETs



PETs are a "coherent system of ICT measures that protects privacy [. . . ] by eliminating or reducing personal data or by preventing unnecessary and/or undesired processing of personal data; all without losing the functionality of the data system" (Borking and Raab, 2001 p.1)



(Cf. Asrow and Samonas, 2021)

bristol.ac.uk

### **Context: Privacy risks**

- Collect, track, monitor "surveillance"
- Aggregate, Analyse "process"
- Distribute, communicate "networks and platforms"

### Top use cases of PETs

- Financial transactions
- Healthcare services
- Facilitating data transfer between multiple parties including intermediaries





The challenge: people's

behaviour

 Successful implementation and adoption of PETs requires a profound understanding of the perceptions and behaviours of actual and possible users (at organizational and end-user levels)

- ACCEPT aims to investigate consumer perspectives on the use and sharing of PETs-related data by various types of 'legitimate' organisations
  - Started 09/2021
  - Currently in research design phase





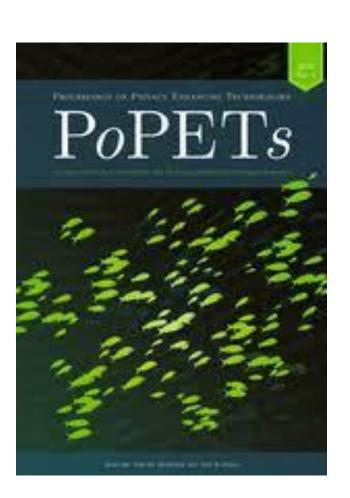
# Getting to grips with research in this area



39 papers retained (>600 scanned, 2015 to date)



Private Machine Learning	Cryptography	Privacy Policies
Data Privacy I	Multiparty Private Machine Learning I	Privacy Preferences
Data Privacy II	Multiparty Private Machine Learning II	Privacy Behaviors
Privacy Attacks	Applied Cryptography I	Privacy Awareness
Web Tracking	Applied Cryptography II	Internet of Things Privacy
Censorship and Certificates	Cryptography and Cryptocurrencies	Mobile Privacy
Website Fingerprinting	Secure Multiparty Computation	DNS and Privacy





# University of BRISTOL Overview of topics covered



Sector-specific papers: Smart homes, Agriculture, Healthcare (apps), Freight/Transport/Security

Specific demographic groups

Specific contextual/situational factors

### Awareness, perception and motivation

- Privacy concerns and privacy behaviours
- Usability privacy trade-off
- Awareness, understanding and consent:
- settings, notification preferences, recording data storage
- Understanding security advice
- Awareness of privacy-enhancing tool, interest in preventing threats, misconceptions

Linguistic understanding/terminology and information visualisation, incl. user design (consent dialogues)

The role of Al/machine learning in understanding user preferences



# Some research questions in the sample of papers



- 'Second-order' categories of users
  - To what extent are incidental users concerned about the privacy risks of smart-home devices? In what capacities, contexts, and situations are people exposed to other people's smart-home devices?
- Stated preferences vs actual behaviour studies
  - What (perceived) benefits and harms do they experience?
- Change in preferences/unstable preferences
  - what circumstances may change original decisions
- Communication suitable for specific groups, .e.g. young women
  - how well do developers inform menstruapp users about their privacy practices within their policies and privacy communications?
- Information visualisation, language use, etc
  - Are users able to understand the purpose of the privacy visualizations and the data flows depicted by the visualizations at-first-glance?

```
understanding
                   focus
          impact
                   use issues
                                                different
     online
                           conducted
                                                      investigated
                                         policies lol
         found
                                                   studies
       browser
     survey theory
            social
participants
                         explore tracking policy people models
        understand
                   categories
                                                    questions
        data
                            awareness
  concerns
               behavior
                                                    incidental
                          information
                      bystanders preferences
           technical
                     factors smart qualitative
                             contextual permission
```



# Tackling these questions: examples of theoretical frameworks applied in the study of PETs

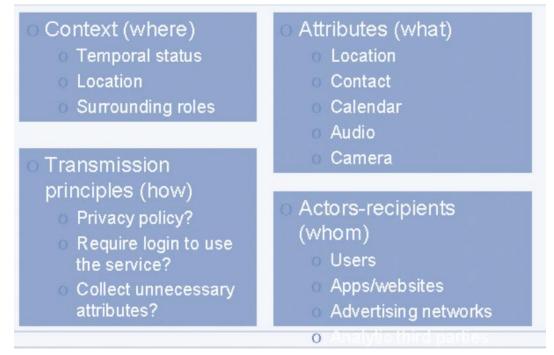


### Some of the theories used:

- Contextual Integrity Theory (Nissenbaum, 2004).
- Privacy Management (CPM) theory (Petronio, 2002).
- Components of Protection Motivation Theory (Albayram et al., 2017).

"Contextual integrity is preserved when information flows conform to legitimate contextual informational norms"

(Nissenbaum, 2021)





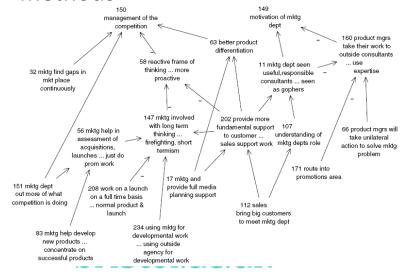
## What about methods? –



Common methods include focus groups, scenario-based methods, interviews, some experimental studies. Common limitation: stated preference versus real behaviour.

### **Elicitation methods**

Making the most of mental model documentation with stakeholders, e.g. Draw Metric methods



Some possible approaches

## Behavioural protocol studies over time

**Experience sampling methods** 

Cheerful Lonely Nervous Cooperative	Not at all 0 0	A little 1	Some what	Very much	(circle one	number Not at all	A S	ome- Very
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302111432220100000		1	2	3	Irritated	0	1	2 3
	0	1	2	3	Relaxed	0	1	2 3
Angry	0	1	2	3	Stressed	0	1	2 3
Responsible	0	1	2	3	Proud	0	1	2 3
Frustrated	0	1	2	3	Friendly	0	1	2 3
Competitive	0	1	2	3	Hardworki	ng 0	1	2 3
Strained	0	1	2	3	Productive	0	1	2 3
					Not at all	A little	Some what	
Were you able to	o expr	ess your	opinior	1?	0	1	2	3
Were others real	lly liste	ning to	what yo	ou had to	say? 0	1	2	3
Did you care ab	out wh	at othe	rs were s	saying?	0	1	2	3
Were others real	lly liste out wh	ening to	what yo	ou had to	at all 0 say? 0 0	little 1 1 1	2 2 2 2	t n

### Online experiments

online randomised control trial with A/B testing or split testing





# So what? Implications for ACCEPT





Privacy-sensitive
Business Models:
Barriers of
Organizational
Adoption of PrivacyEnhancing
Technologies

willingness to pay
e.g. for smart home
privacy?



## Implications for ACCEPT: co-creating the behavioural studies





Understanding organizational strategymaking challenges when it comes to adoption decisions related to PETs

Understanding end-user behaviour towards PETs



We have the (human) resources – you have the real-world experience/challenges:

How can we make this research most relevant to you?

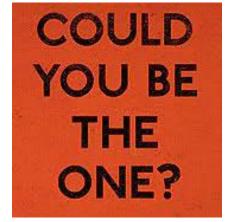


- Facilitate a workshop/conduct expert interviews in their organization to elicit/codesign their strategically-relevant questions relating to PETs adoption
- Help us identify a possible user group to conduct the research (survey, interviews, experiment, focus group) on to answer their strategic questions











# If you are interested in the research:



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To learn more about REPHRAIN, our future plans and how to get involved:



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We would love to hear from you. Thank you!