



Bridging Barriers: A Survey of Challenges and Priorities in the Censorship Circumvention Landscape

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The day the news died Here are all Russia's independent media outlets banned, blocked, or shuttered in just the past few days

12:49 am, March 5, 2022 · Source: Meduza

The UK's Controversial Online Safety Act Is Now Law

The UK government says its Online Safety Act will protect people, particularly children, on the internet. Critics say it's ineffective against dangerous misinformation and may be a threat to privacy.

RISING INDIA, TOXIC TECH

How India tamed Twitter and set a global standard for online censorship

By [Karishma Mehrotra](#) and [Joseph Menn](#)

EFF

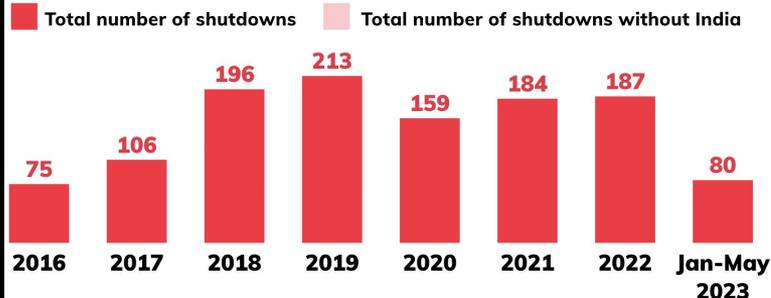
DONATE

The U.S. Government Wants To Control Online Speech to "Protect Kids"

DEEPLINKS BLOG

Documented internet shutdowns by year *

* These numbers reflect the latest data available as of publication of this update since the [report of internet shutdowns in 2022](#). The 2023 data includes shutdowns we identified preliminarily between January 1 and May 19 of 2023.



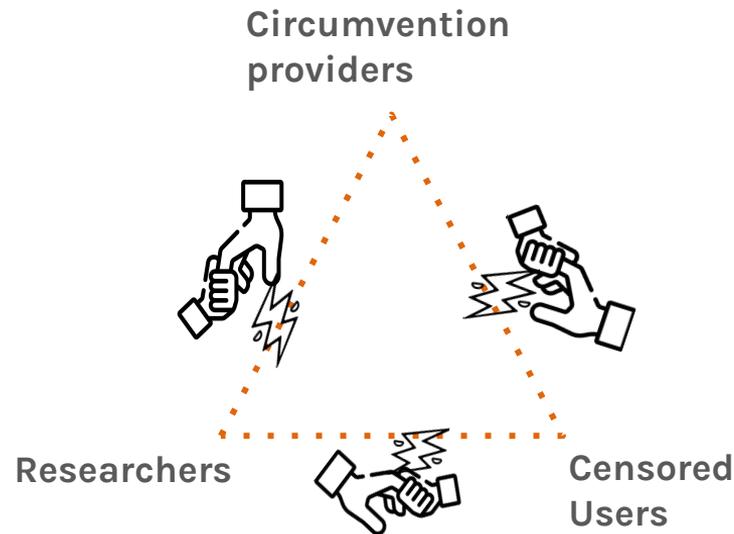
Governor Abbott Announces Statewide Plan Banning Use Of TikTok

Austrian ISPs 'Had No Choice' But to Block Pirate Sites AND Cloudflare

The Ecosystem of Censorship Circumvention Tools (CTs)

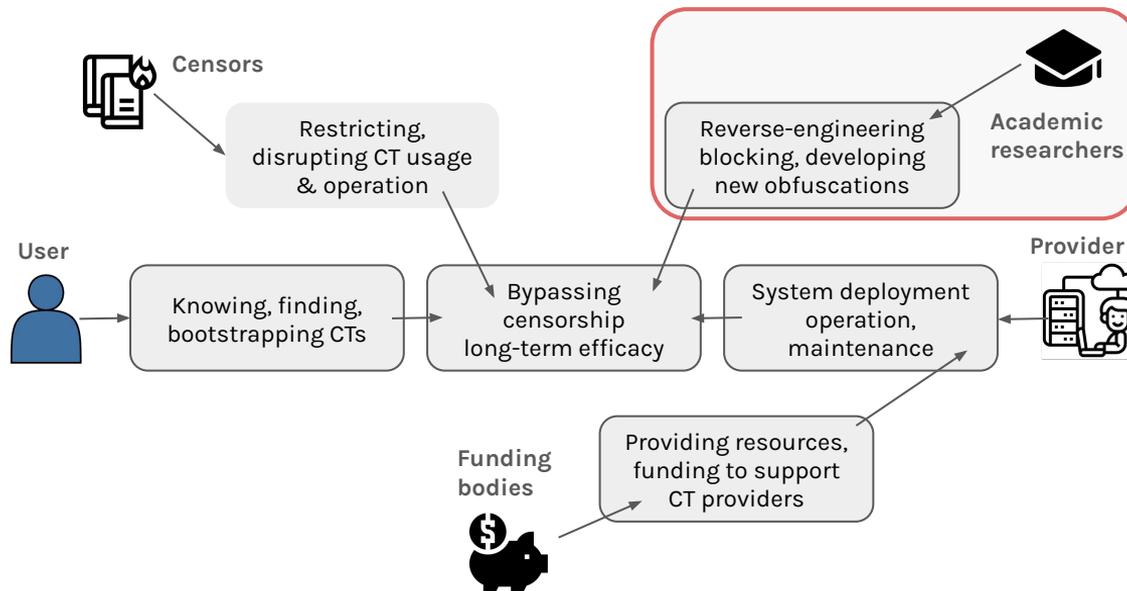
One of the most **opaque** ecosystems

- Different from other S&P tools
- **Inherently adversarial**
- Legal grey area; risks to those operating & using CTs.
- **Limited communication** between stakeholders
 - Cannot openly promote, discuss, or provide feedback



→ We know little about how the CT ecosystem functions in the wild

The Ecosystem of Censorship Circumvention Tools (CTs)



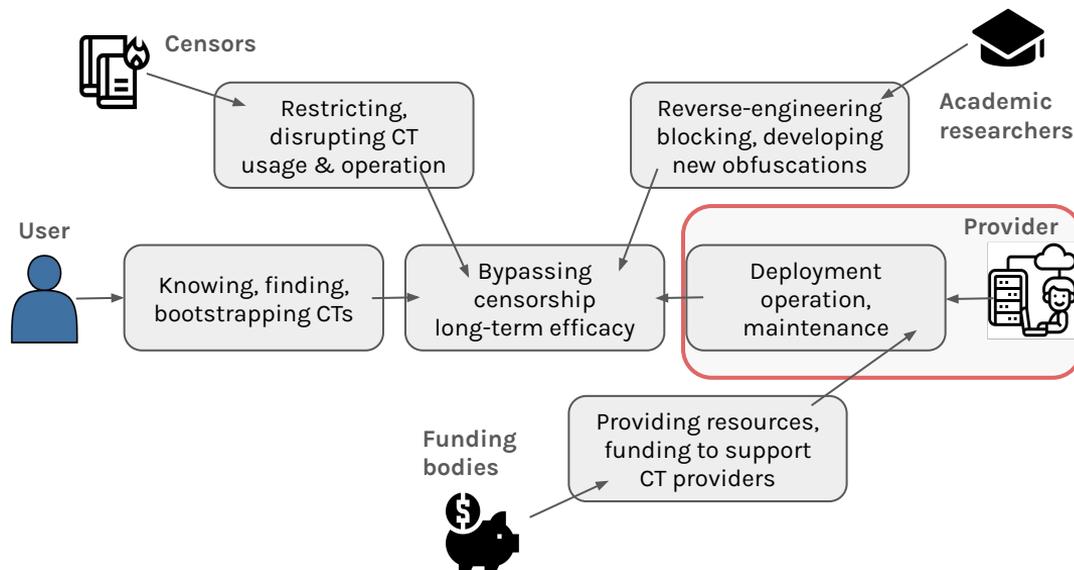
The Ecosystem of Censorship Circumvention Tools (CTs)

How do **users** find about circumvention tools?

⇒ Censored access, active adversary

How do **providers** sustain their operations?

⇒ Funding, disruption from censor, etc



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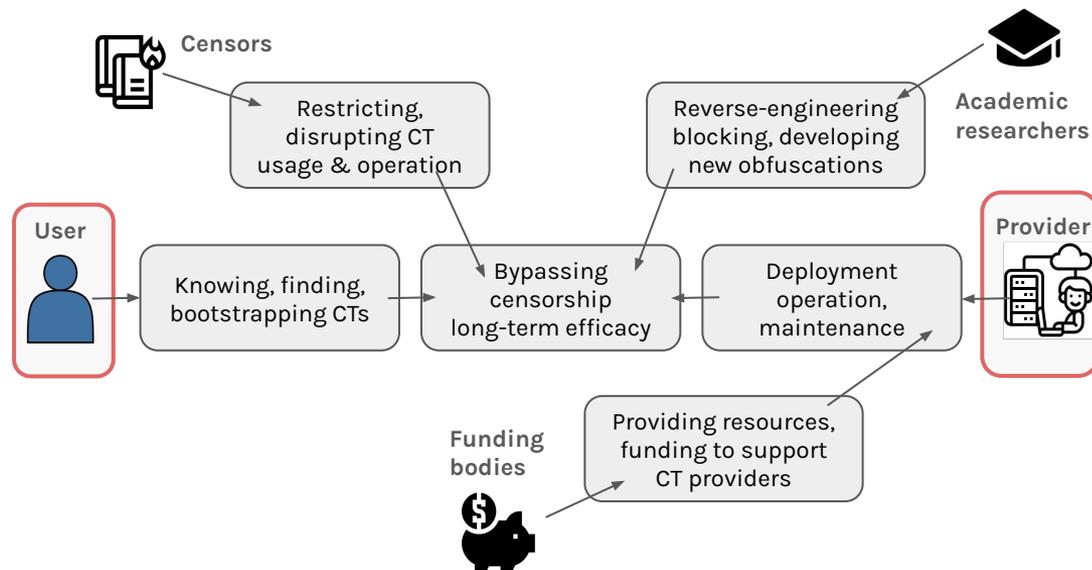
↪ Censored access, active adversary

How do **providers** sustain their operations?

↪ Funding, disruption from censor, etc

How do **users and providers** manage risks?

↪ How do they establish trust?



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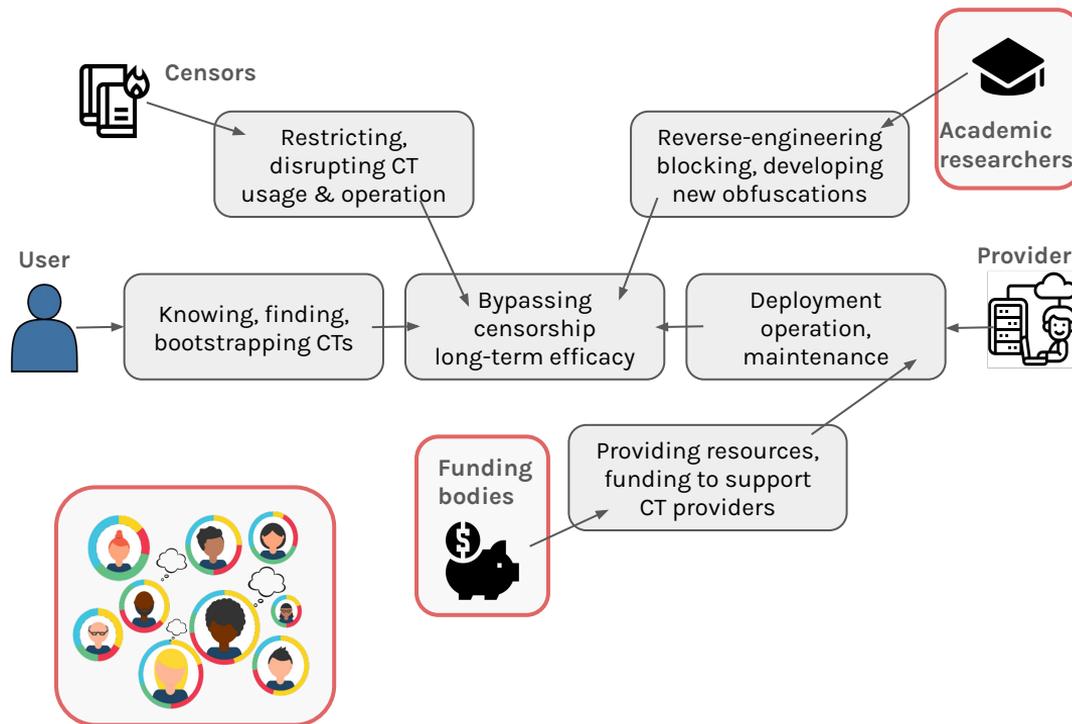
⇒ Funding, disruption from censor, etc

How do **users and providers** manage risks?

⇒ How do they establish trust?

What can **we** do?

⇒ Funding agency, academia, big tech



Study of Circumvention Providers and Censored Users

Goal

Illuminate **dynamics and challenges** of the circumvention ecosystem.

- Outline key challenges currently facing
- **Highlight priorities for concerted efforts.**

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Semi-structured Interviews

19 individuals from 12 organizations operating circumvention tools

24 user-facing interviews.

Inductive open-coding, and **thematic analysis**

Study of Circumvention Providers and Censored Users

Motivation for Circumvention

Perception of censorship

Perception of circumvention

Local alternatives

Discovery and Bootstrapping

Challenges in CT discovery

Discovery and outreach strategy

Payment complications

Operation and Usage

Blocking

Service Recovery

Communication

Funding and sustainability

Usability

Risk and Trust Consideration

Risk from authority

Risk from malicious providers

Trust and mistrust

Access over trust

Misconceptions and threat models

Identified Future Priority

Bootstrapping

Outreach

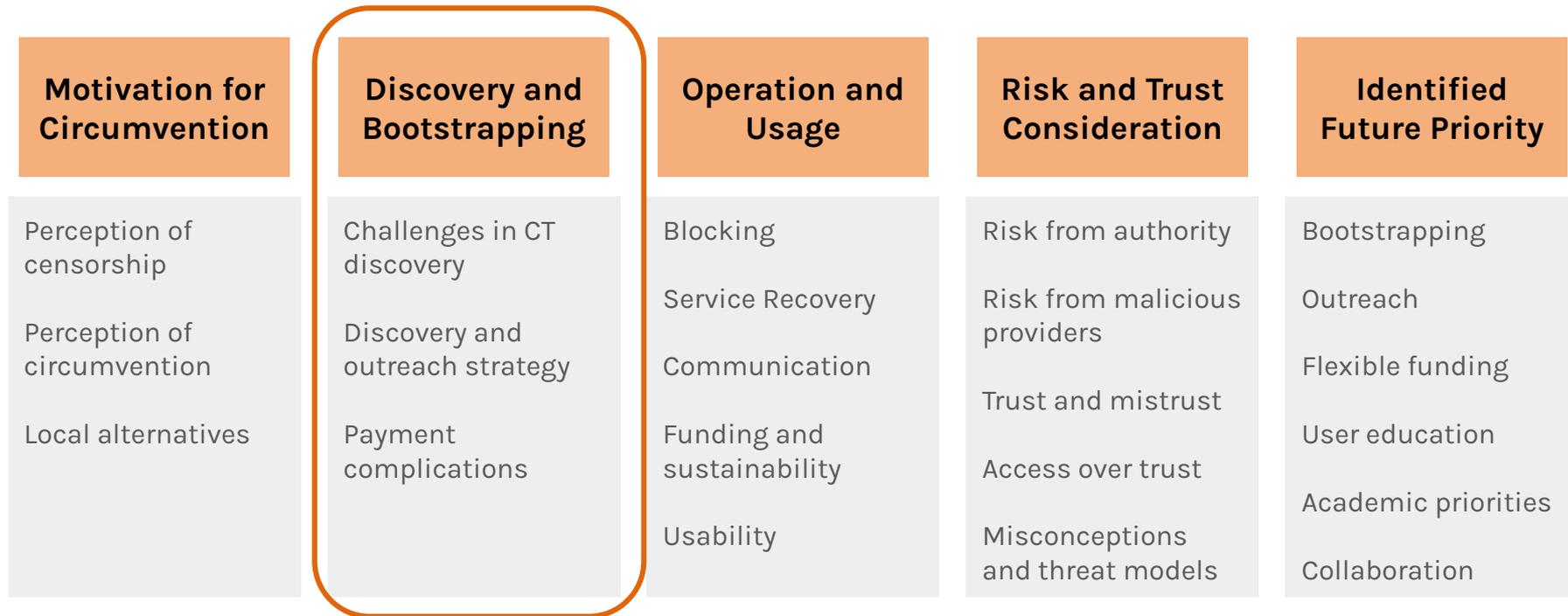
Flexible funding

User education

Academic priorities

Collaboration

Study of Circumvention Providers and Censored Users



Study of Circumvention Providers and Censored Users

Motivation for Circumvention	Discovery and Bootstrapping	Operation and Usage	Risk and Trust Consideration	Identified Future Priority
<p>Perception of censorship</p> <p>Perception of circumvention</p> <p>Local alternatives</p>	<p>Challenges in CT discovery</p> <p>Discovery and outreach strategy</p> <p>Payment complications</p>	<p>Blocking</p> <p>Service Recovery</p> <p>Communication</p> <p>Funding and sustainability</p> <p>Usability</p>	<p>Risk from authority</p> <p>Risk from malicious providers</p> <p>Trust and mistrust</p> <p>Access over trust</p> <p>Misconceptions and threat models</p>	<p>Bootstrapping</p> <p>Outreach</p> <p>Flexible funding</p> <p>User education</p> <p>Academic priorities</p> <p>Collaboration</p>

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Motivation for Circumvention Adoption

- Circumvention is preceded by the awareness of censorship.
- Users showed a **sense of resignation** towards censorship:
 - Accepting censorship as part of “daily reality”.
- Circumvention driven by **tangible inconveniences** due to blocking.
 - Existence of **local alternatives** reduces the urgency to circumvent.

[Provider]

“Massive population who are blissfully unaware that outside Internet exists

...

there’s a **complete domestic ecosystem** that people almost never accidentally stumble upon a website that’s censored

...

no one ever regrets [circumventing], it’s just that **people don’t know what they are missing out.**“

Discovery & Bootstrapping Circumvention Tools (CTs)

- CT discovery is challenged by the **copyright on information about CTs**.
 - Advertisement, search engines, appstores, are not viable.
- Providers and users adopt covert approaches to connect each other.
 - Synonyms, word-of-mouth, underground networks, etc
 - **“Use CT to find CT”**
 - Work with local partners

[User]

“I use a free shady VPN ... to then find more reliable tools. **I can search from Google, but first I'll need to have access to Google.**”

[Provider]

“We always wonder **how do we reach people without any CTs?** Many of our users switched from some other worse CTs. How can these users find us directly [when] obviously our website is blocked?”

Operation and Usage

- Circumvention tools frequently get disrupted or blocked by censors.
- To restore service, providers need visibility into the other side of firewall.
 - Measure blocking, testing effectiveness of any fix.
- **Absence of dev-feedback loops complicate iterative development of CTs**
 - Communication channel further constrained during blocking.

[Providers]

“Feedback is sparse compared to the changes of censorship behaviors.”

“I observe many outages but have little means to diagnose the cause.

The available user reports are vague, confused, non-technical, and irreproducible. I try to come up with some general obfuscation, but again, have no way to validate their effectiveness.”

Risk and Trust Considerations

- **Risks** associated with circumvention emphasizes the importance of **Trust**.
- Both sides acknowledge **a pervasive distrust** within the ecosystem.
 - Snitching
 - Misbehaving providers
- Distrust has limited influence on users' decisions to start using a CT.
 - Users **knowingly expose themselves**, driven by the need for access.

[Provider]

“They [other providers] keep logs and IDs so that if the government comes knocking, they have something to bribe - like saying

‘Don’t put me in jail, put these people in jail’ “

[User]

*“I use whatever VPN that gets me connected. I don’t know how it works, but **since I had to use it, I had to trust it.**”*

Identified Future Priorities

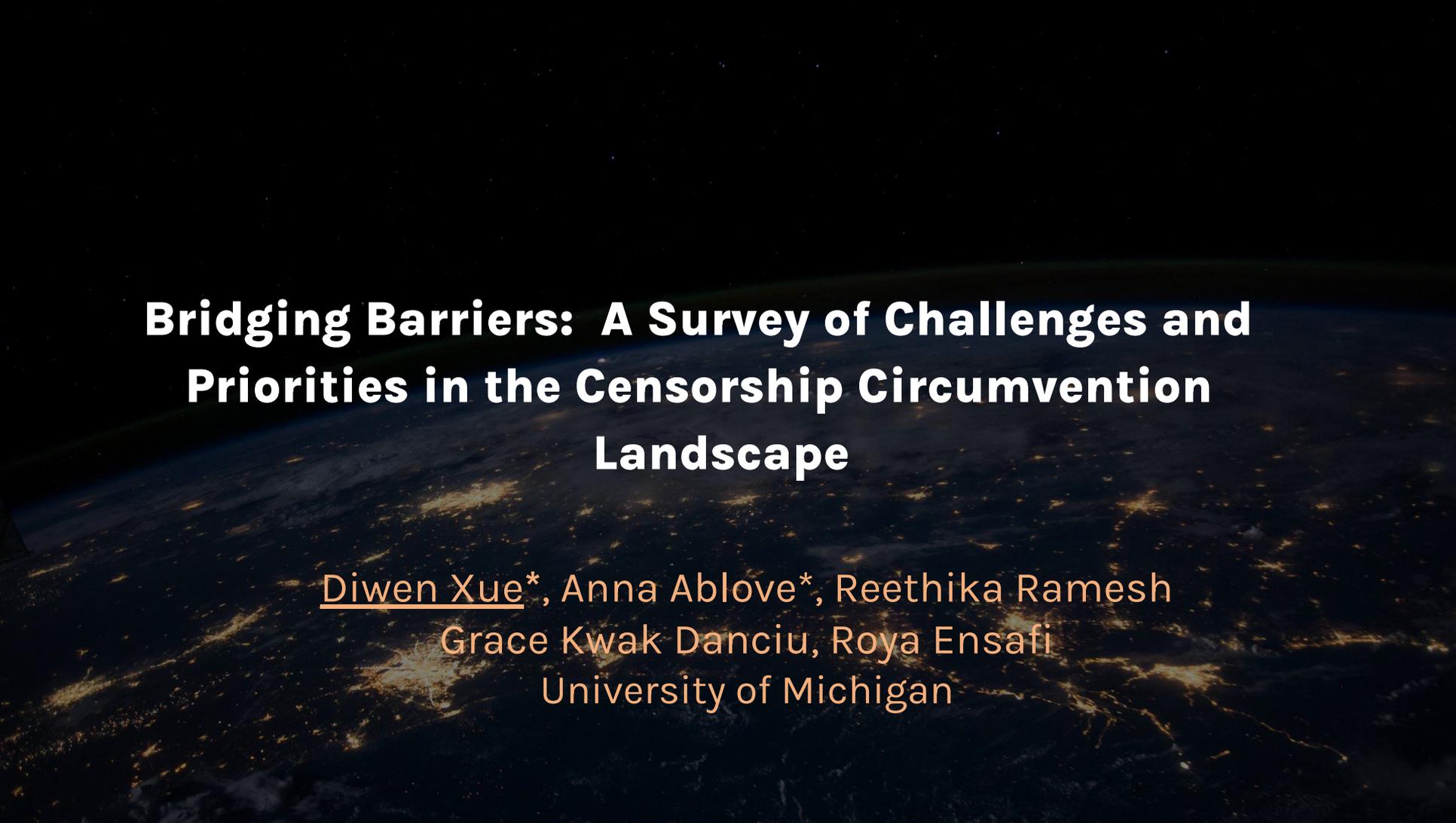
- **Bootstrapping Challenges**
 - Fetching configuration, authentication, server/IP rotation, etc
 - Require cross-firewall connections that the CT cannot yet facilitate until bootstrapping completes
 - Presuppose “out-of-band” channels, e.g., untrusted third-party VPN
- **Flexible Funding**
- **Outreach & Feedback Channels**
- **Academic Priorities vs. On-the-ground Needs**
- **User Education**
- **Collaboration & Community**

Identified Future Priorities

- Bootstrapping Challenges
- Flexible Funding
- Outreach & Feedback Channels
- **Academic Priorities vs. On-the-ground Needs**
 - The localized nature of censorship (and circumvention) places researchers based outside at a disadvantage.
 - **“Trying to solve a problem you don’t experience or understand.”**
- User Education
- Collaboration & Community

Identified Future Priorities

- Bootstrapping Challenges
- Flexible Funding
- Outreach & Feedback Channels
- Academic Priorities vs. On-the-ground Needs
- User Education
- **Collaboration & Community**
 - Engage with in-situ grassroots groups for a better understanding of the specific censorship practices and needs.
 - Technical & ethical complexities to establish communication in the presence of active adversaries.
 - The need to foster collaboration and a sense of community.



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