Co-Designing a Mobile App for Bystander Privacy Protection in Jordanian Smart Homes A Step Towards Addressing a Complex Privacy Landscape

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THE ADVANCED
COMPUTING SYSTEMS
ASSOCIATION

This Research

Co-design a technology probe in the form of a mobile app to assess how the app could support privacy protection of bystanders in Jordanian smart homes.

Focuses on non-western context specifically, Jordan

Investigates privacy concerns, power dynamics, design challenges, regulation, and contextual influences on privacy concerns in Jordanian smart homes.

Provide recommendations for the technology probe (the app) that aim to support privacy protection of bystanders in Jordanian smart homes, and to inform future research

Research Context Jordan

- Arab Country in the Middle-East

- Majority of Muslim Population

- Moderate Muslim Country

- Moderate Conservative Social Norms Demographic structure has a significant proportion of immigrants from surrounding countries

- Domestic workers (e.g. maids, nannies, and babysitters), are predominantly women and come from Far East and African countries (e.g., Ethiopia, Bangladesh, Sri Lanka, Philippines, Kenya, and Indonesia)

- Foreign domestic workers encounter many challenges, including limited agency and rights, long working hours, low wages, and restrictions on freedom of movement without their employer's permission
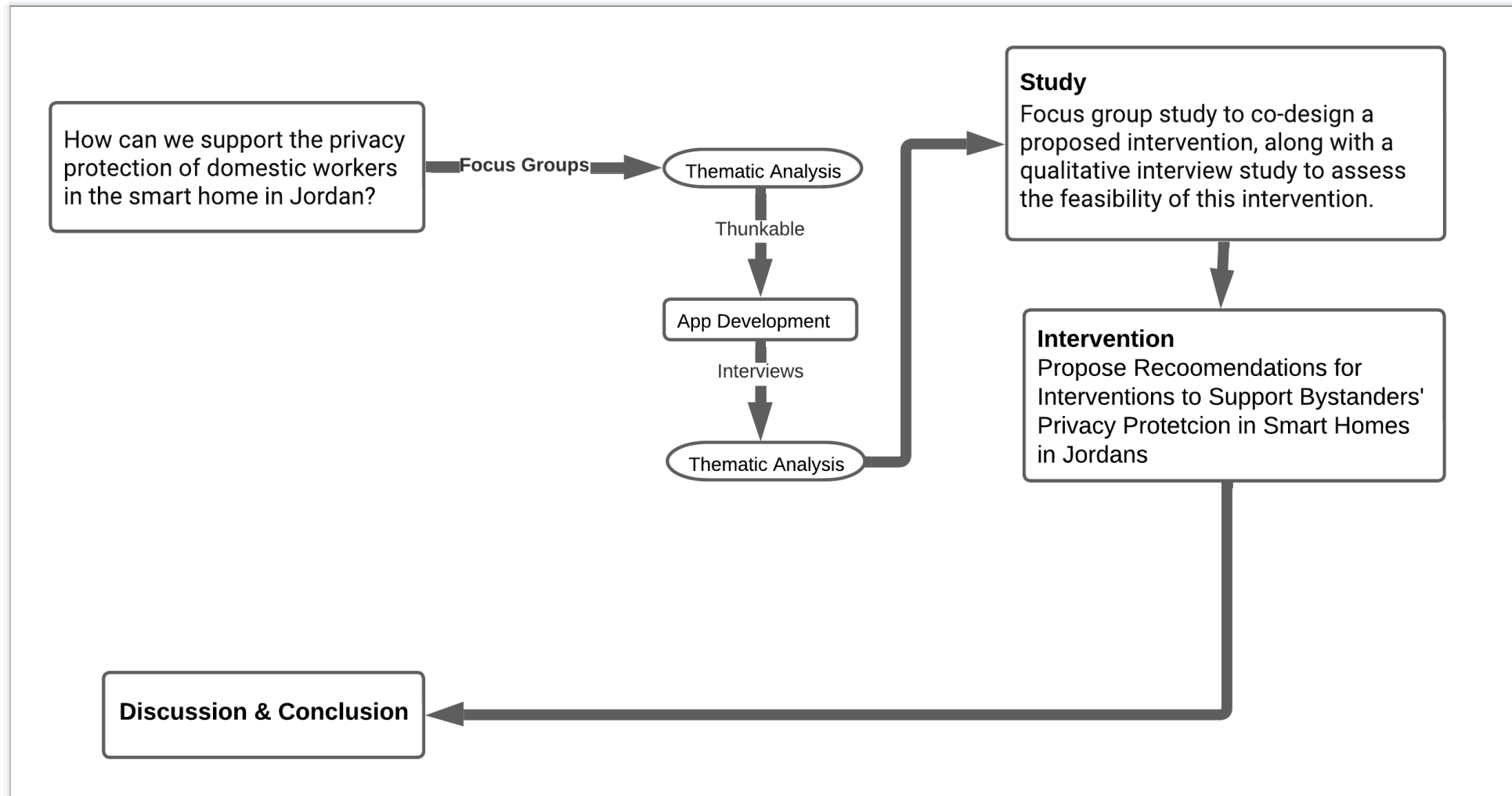
Research Problem, Gap, and Motivation

The research study aims to answer the main research question: "How can we support the privacy protection of domestic workers in the smart homes in Jordan?"

- Limited research exists on privacy concerns of smart home bystanders.

- Scarcity of research on smart home privacy in MAME context of Jordan.

- Limited research on contextual factors' impact on smart home privacy.

- Inadequate research on socioeconomic power differentials and privacy concerns.

- There is a lack of explicit data protection regulation in Jordan.

- There is a lack of technical interventions that aim to support privacy protection of bystanders in the smart homes.

Research Question, Studies, and Methodologies

Research Question, Studies, and Methodologies

How can we support the privacy protection of domestic workers in the smart home in Jordan?

Focus Groups → Thematic Analysis

Thunkable

Study
Focus group study to co-design a proposed intervention, along with a qualitative interview study to assess the feasibility of this intervention.

This study focuses on leveraging insights from previous research to propose recommendations for enhancing privacy protection for smart home bystanders in Jordan. We co-designed a technology probe in the form of mobile application as an auxiliary tool to support the privacy protection of domestic workers in Jordanian smart homes.

Discussion & Conclusion

Research Question, Studies, and Methodologies

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App Development

Interviews

Thematic Analysis

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Propose Recoomendations for Interventions to Support Bystanders' Privacy Protetcion in Smart Homes in Jordans

To gather data, we employed focus group sessions in the first study phase, and we employed semi-structured interviews for the second study phase.

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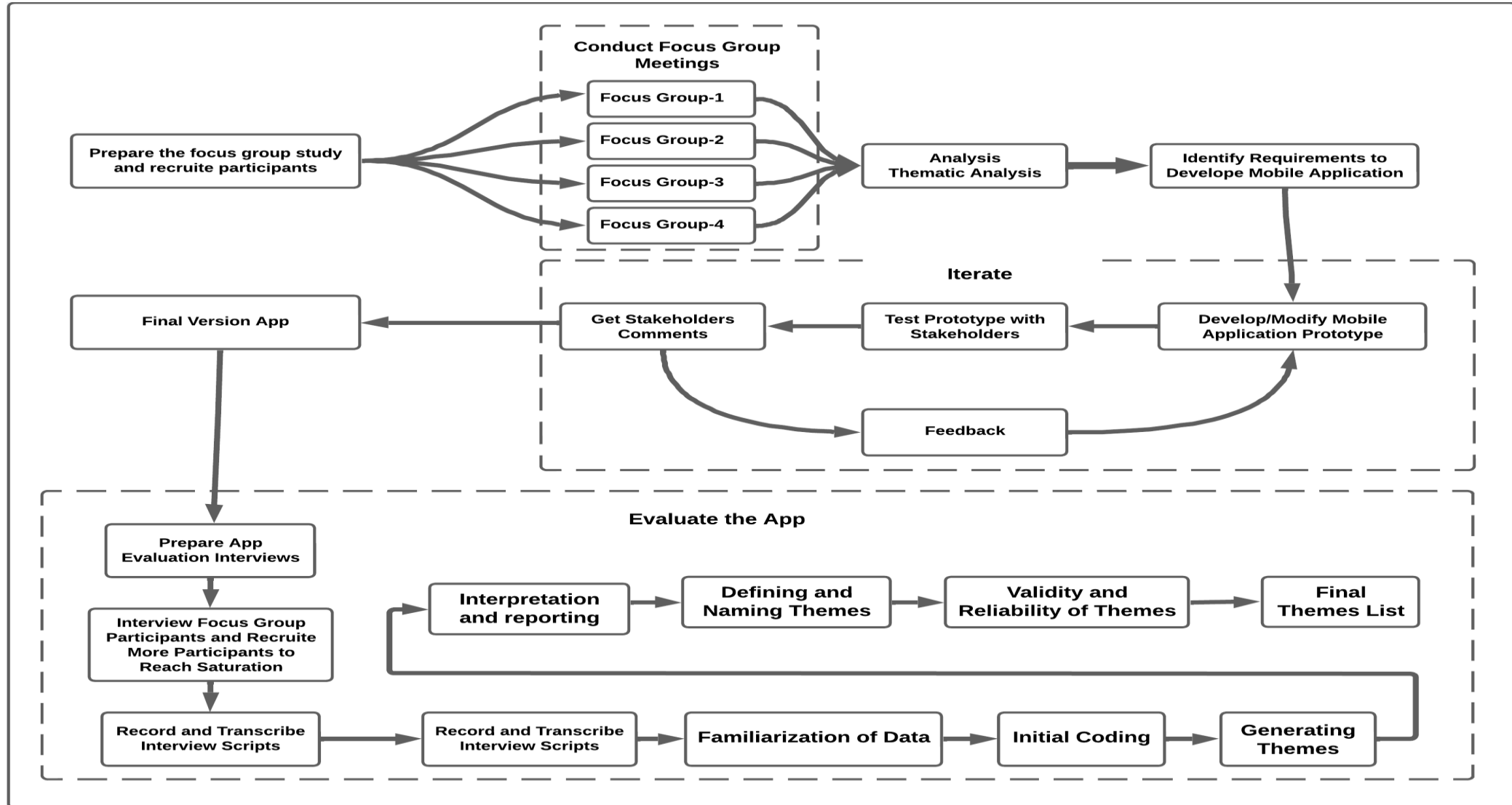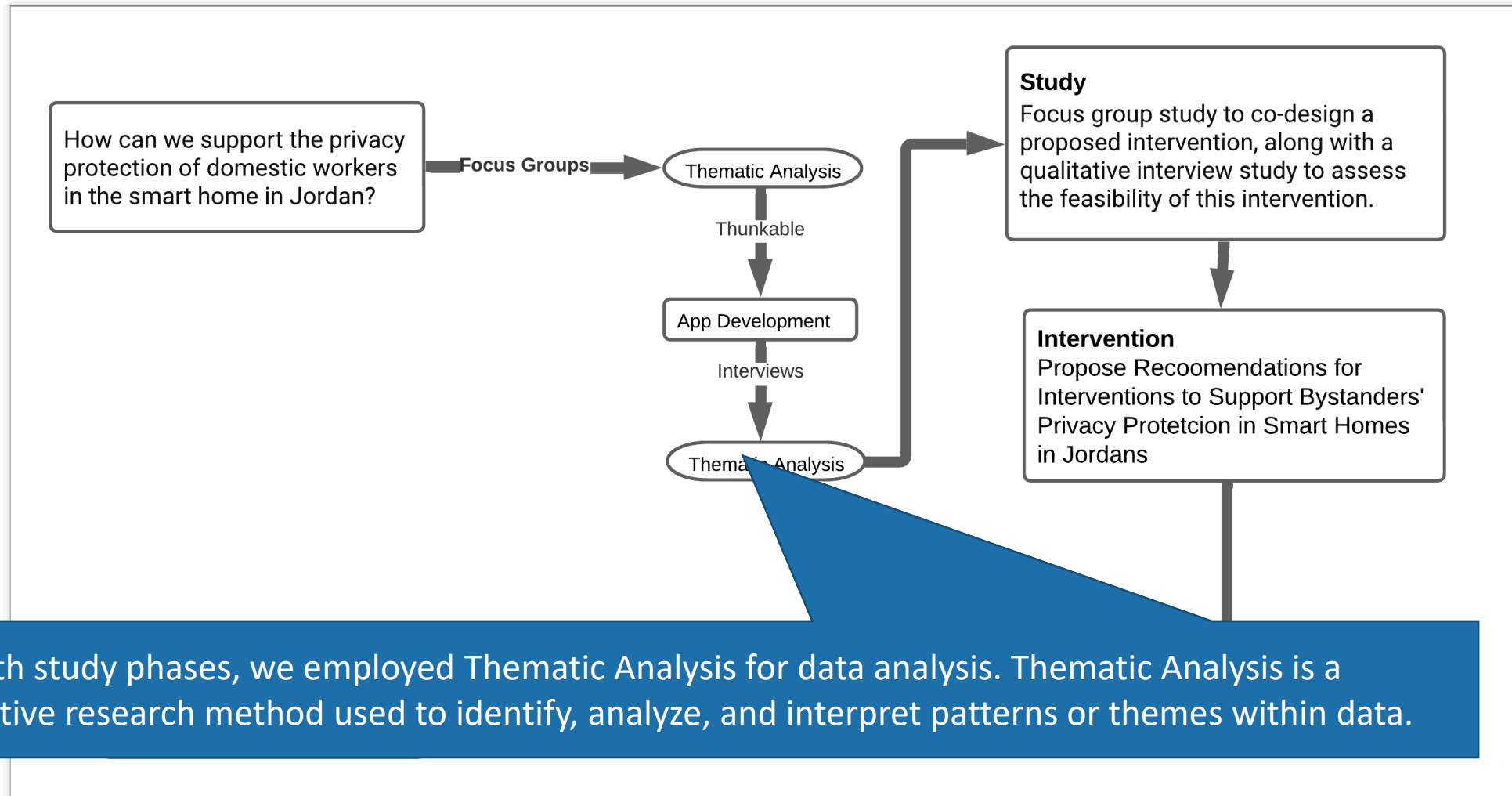
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Co-Design Research Approach

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For both study phases, we employed Thematic Analysis for data analysis. Thematic Analysis is a qualitative research method used to identify, analyze, and interpret patterns or themes within data.
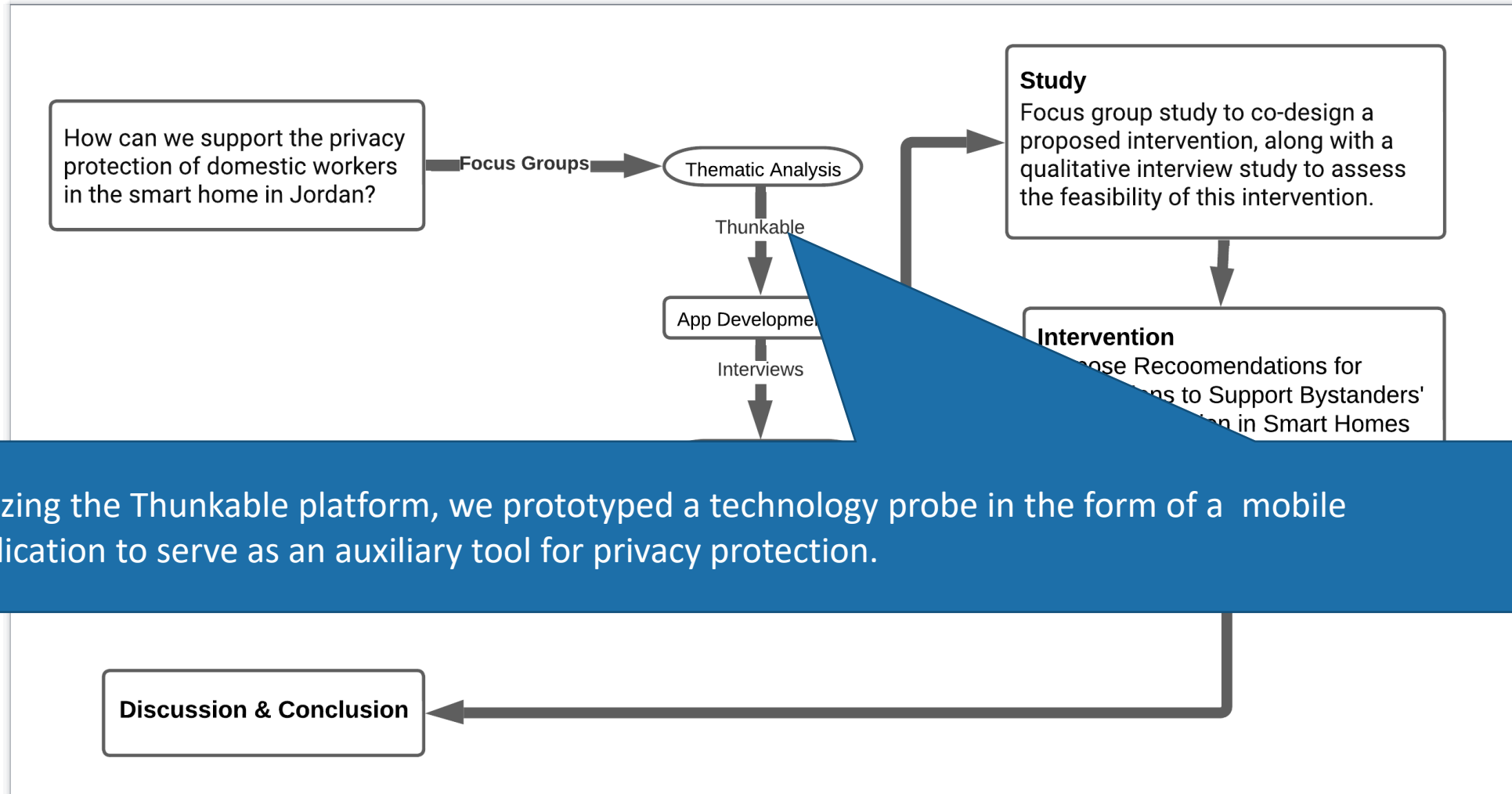
Co-Design Focus Groups Outcomes
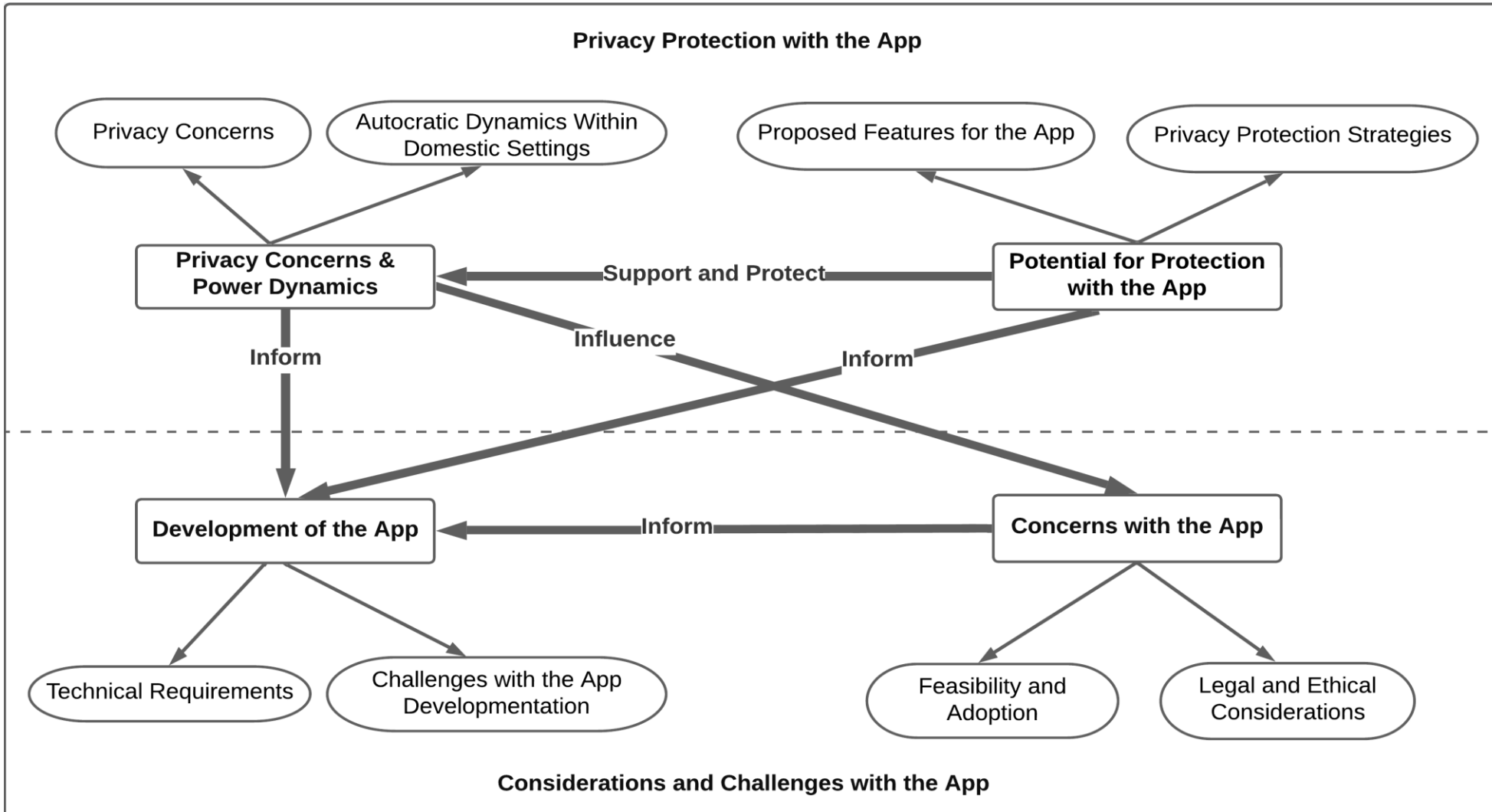
Regulatory Overview

Regulation/Law Name	Articles	Coverage	Personal Data and Smart Home Users
Cyber-Crime Law[48]	11, 13	Mass Surveillance, Online Defamation	Depends on Proving Material Damage
Telecommunications Law[49] No. 13/1995	56	Private Communications	No
Penal Code[50]	3, 4, 348, 356	Penalizes dissemination of Private Data	Depends on Proving Material Damage
Labour Law[52]	All	General work terms and conditions	No
Access to Information Law[54]	13	Correspondence Between Government Entities	No
Credit Information Law[53] No.15/2010	8, 18	Credit Status	No

Country	MAME	Data Law	Regulatory Body	Year Enacted	Smart Home Consideration
Jordan	Yes	None	None	—	Not Expected
Saudi Arabia	Yes	PDPL[57]	SDAIA[56]	2021	No
UAE	Yes	Decree No. 41[60]	UAE Data Office[59]	2021	No
Qatar	Yes	PDPPL[62] Law No. 13	QFC[61]	2016	No
Bahrain	Yes	PDPL[66] Law No. 30	MoJ[65]	2019	No
Oman	Yes	DP[64] Law No. 06	MTCIT[63]	2022	No
Kuwait	Yes	None	None	—	No
Egypt	Yes	PDPL[69] Law No. 151	PDPC[68]	2020	No
Lebanon	Yes	Law[67] 81	None	2018	No
Iraq	Yes	None	None	—	No
Syrina	Yes	None	None	—	No

Country	Data Law	Regulatory Body	Year Enacted	Smart Home Consideration
Turkey	DPL[32]	KVKK[42]	2016	Not Explicitly
Europe	GDPR[55]	EDPS[43]	2018	Not Explicitly
USA	State Dependent	State Dependent	2022	No
China	PIPL[40]	CAC[44]	2021	No
Brazil	LGPD[33]	ANPD[45]	2021	Not Explicitly
India	DPDP IT Act[41]	None	2020	No
Canada	PIPEDA Act[31]	OPC[46]	2000	Not Explicitly

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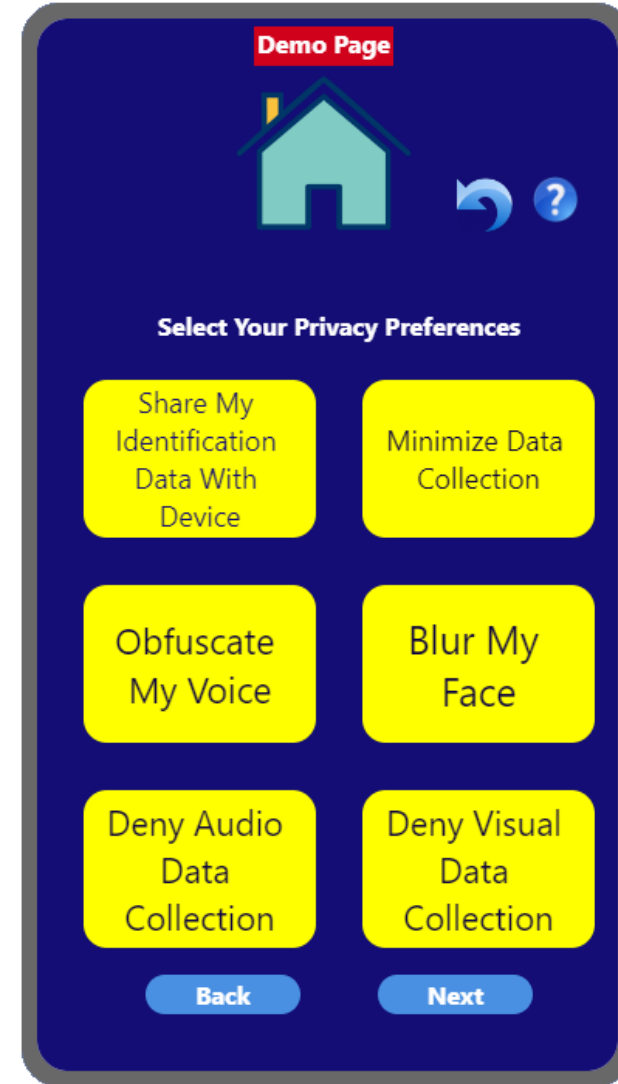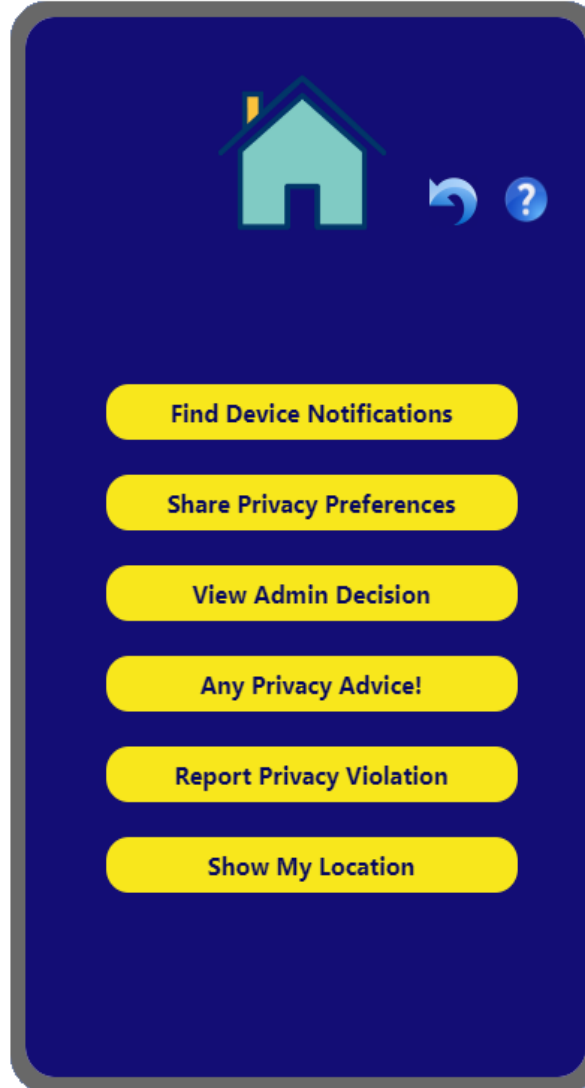
Discussion & Conclusion

Utilizing the Thunkable platform, we prototyped a technology probe in the form of a mobile application to serve as an auxiliary tool for privacy protection.
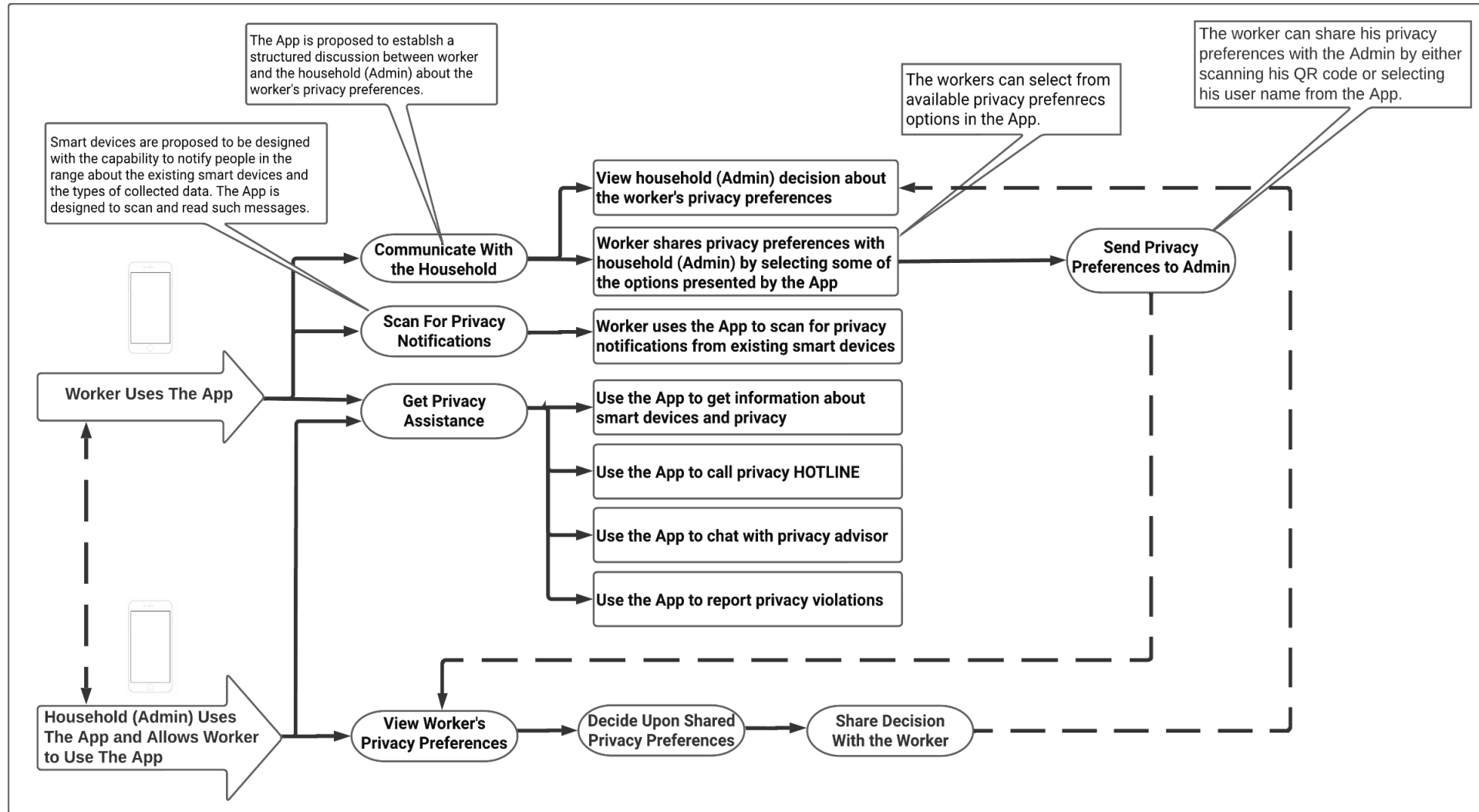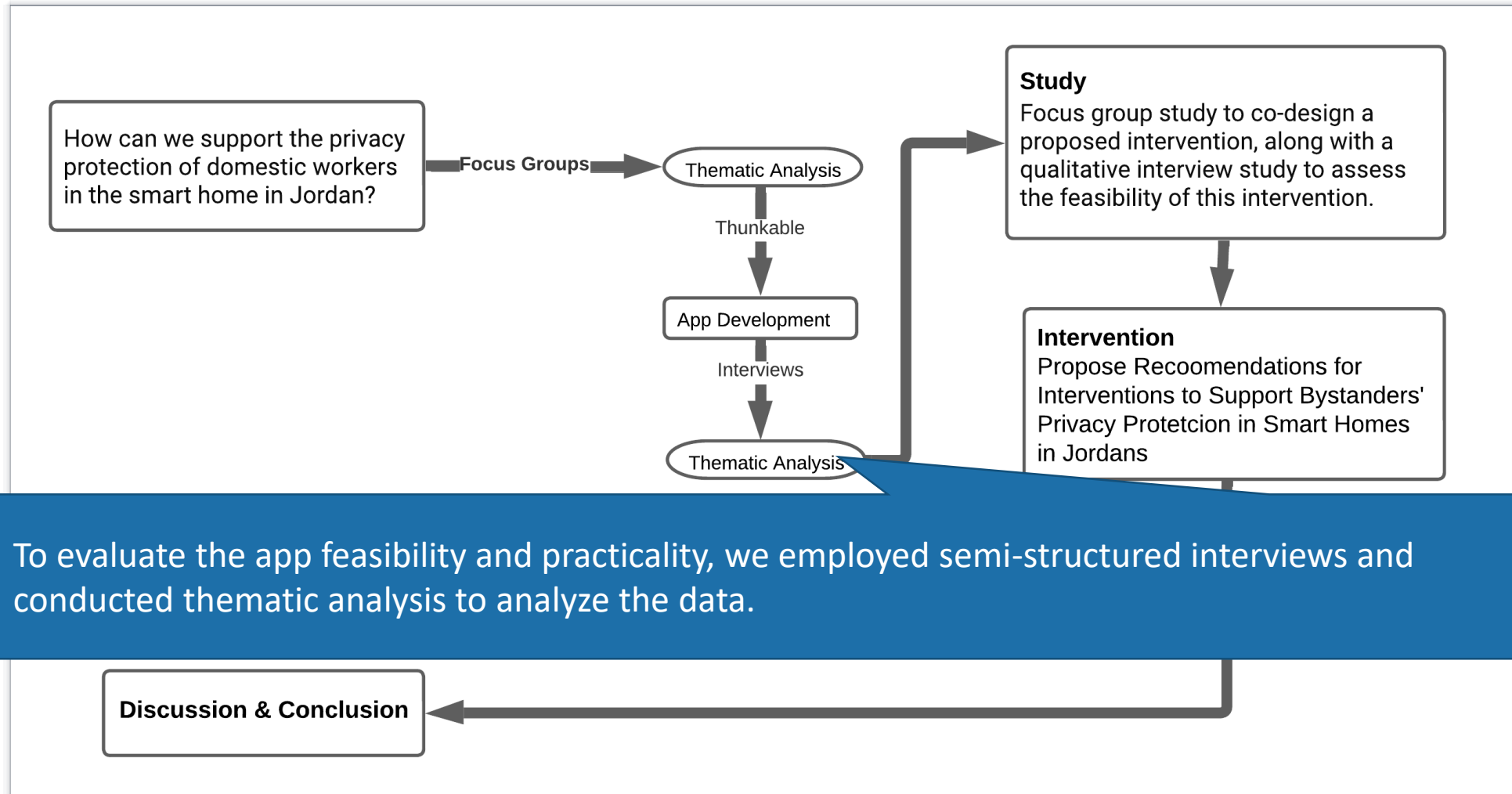
Privacy Support App

App User Guide
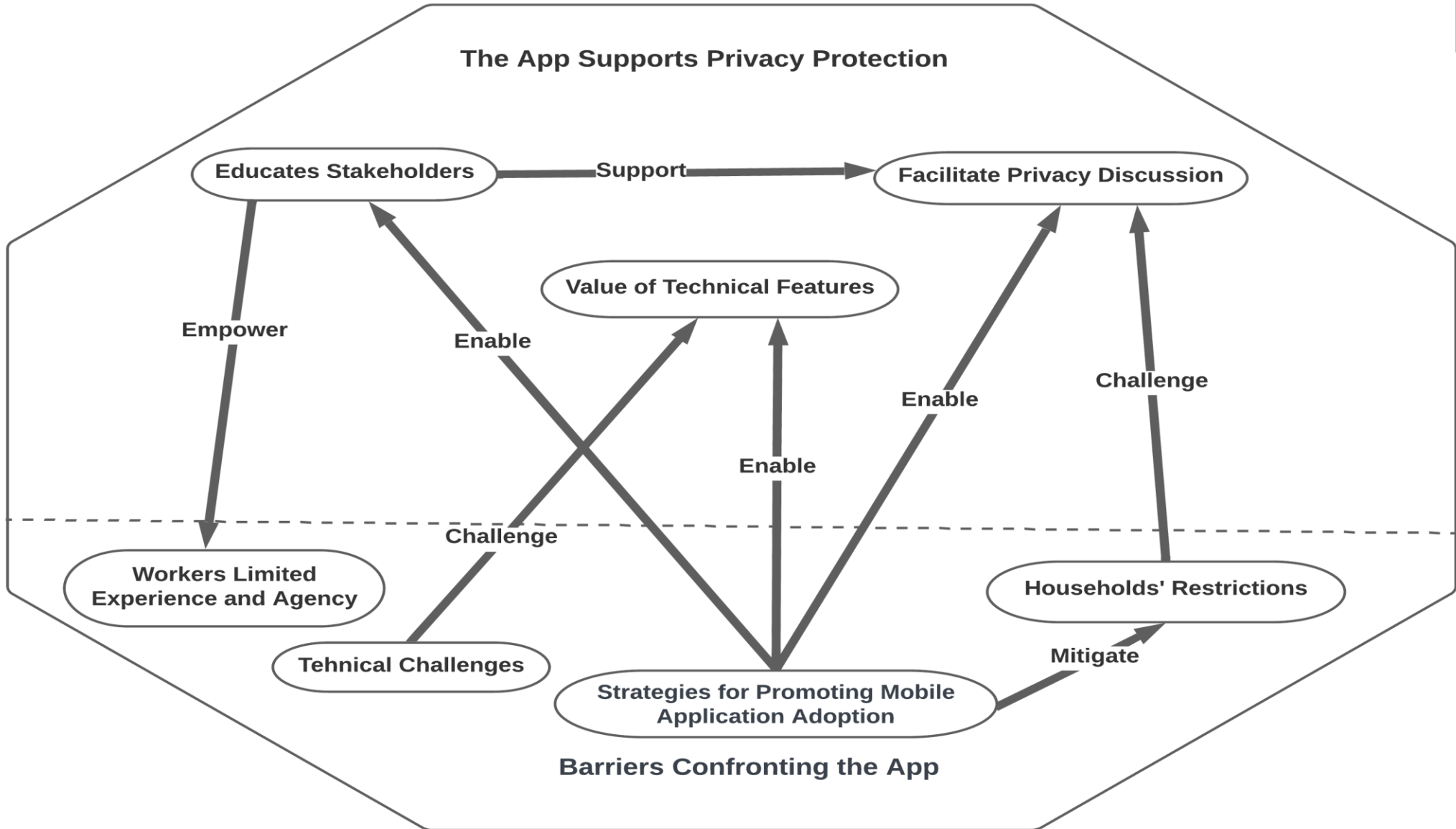

The App is proposed to establsh a structured discussion between worker and the household (Admin) about the worker's privacy preferences.

Smart devices are proposed to be designed with the capability to notify people in the range about the existing smart devices and the types of collected data. The App is designed to scan and read such messages.

The workers can select from available privacy prefenrecs options in the App.

The worker can share his privacy preferences with the Admin by either scanning his QR code or selecting his user name from the App.

View household (Admin) decision about the worker's privacy preferences

Communicate With the Household

Worker shares privacy preferences with household (Admin) by selecting some of the options presented by the App

Send Privacy Preferences to Admin

Scan For Privacy Notifications

Worker uses the App to scan for privacy notifications from existing smart devices

Worker Uses The App

Get Privacy Assistance

Use the App to get information about smart devices and privacy

Use the App to call privacy HOTLINE

Use the App to chat with privacy advisor

Use the App to report privacy violations

Household (Admin) Uses The App and Allows Worker to Use The App

View Worker's Privacy Preferences

Decide Upon Shared Privacy Preferences

Share Decision With the Worker

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To evaluate the app feasibility and practicality, we employed semi-structured interviews and conducted thematic analysis to analyze the data.

Discussion & Conclusion

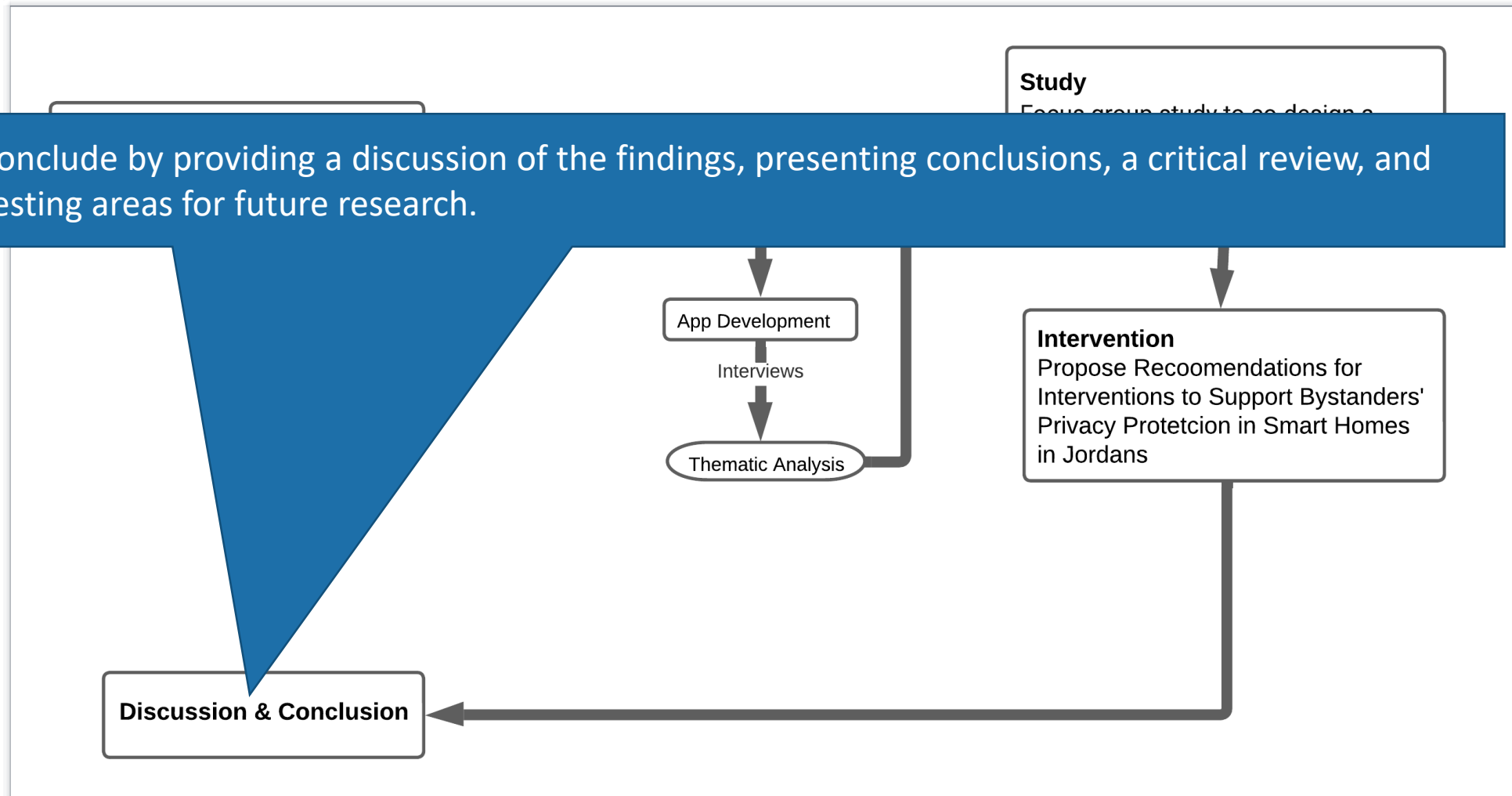# App Evaluation Outcomes

Based on the collective insights from our research studies, we present recommendations for interventions to support and enhance privacy protection of smart home bystanders in Jordan by better utilization of auxiliary tools similar to our technology probe (the app)

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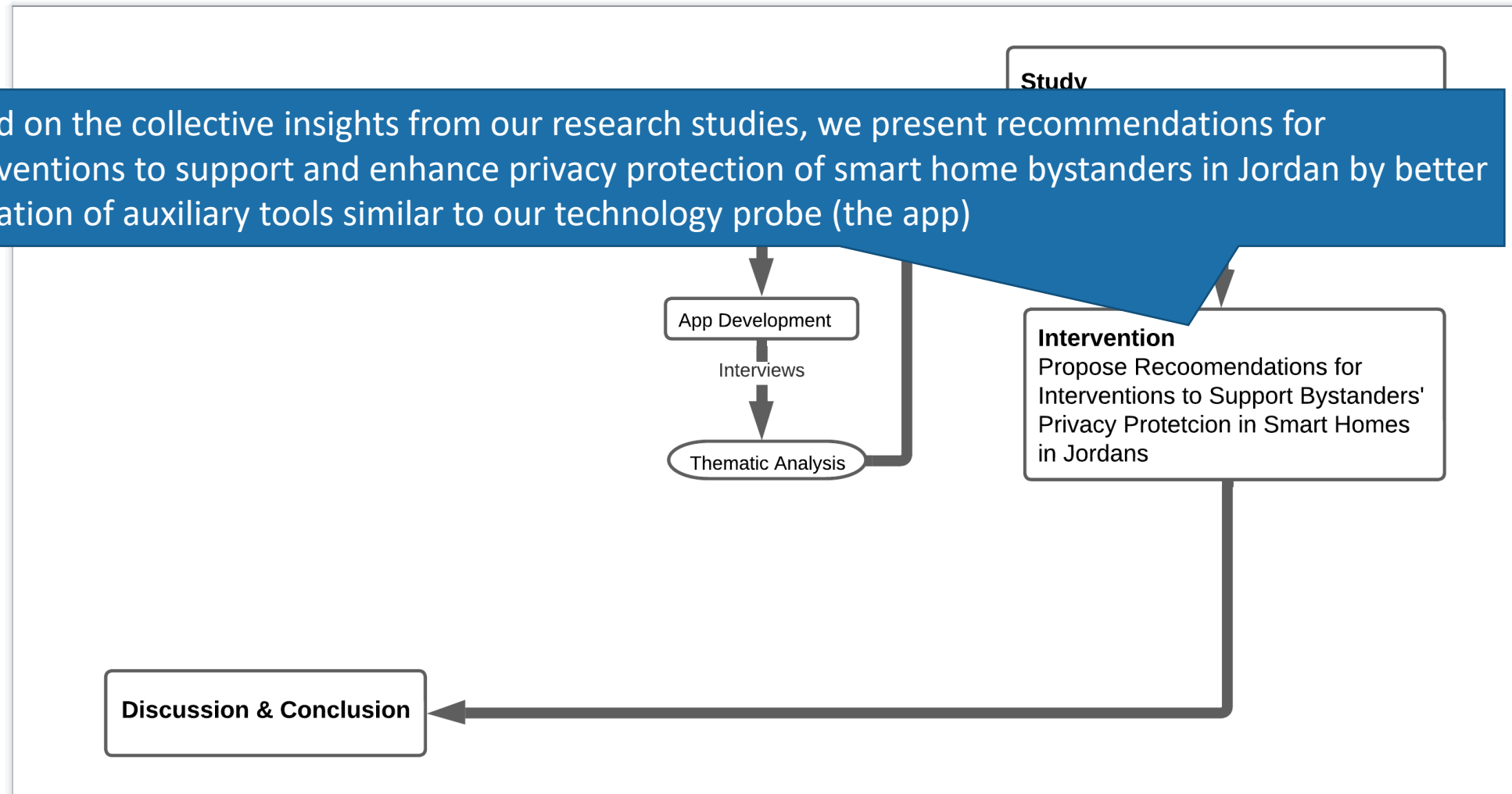
Research Question, Studies, and Methodologies

We conclude by providing a discussion of the findings, presenting conclusions, a critical review, and suggesting areas for future research.

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Focus group study to co-design a

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Discussion & Conclusion

Main Discussion and Recommendations

- **The Jordanian Context is Overlooked**

- **Privacy Concerns and Power Dynamics**
  - Bystanders Privacy Concerns with Smart Homes
  - Limited Awareness of Smart Technologies and Privacy
  - Limited Role of Domestic Workers' Recruitment Agencies

- **Power Dynamics and Contextual Influences**

- **Vague Data Protection Regulation**

- **Design Insights For Privacy Mobile App**

- **Social Interventions**
  - The App to Educate Stakeholders
  - The App Balance Power Dynamics
  - Address App adoption barriers

- **Technical and Business Interventions**
  - Consider Jordanian Context
  - Utilize Innovative Technologies
  - Multi-User Consent
  - Semiotics For Smart Devices
  - Adopt Privacy by Design (PbD)
  - Responsible Innovation

- **Legal Interventions**

Conclusion

- **Jordanian Context Oversight**

- **Limited Awareness of Smart Technologies and Privacy**

- **Asymmetric Power Dynamics and Contextual Influences**

- **Lack of Explicit Privacy Regulation**

- **Auxiliary Tools for Privacy Enhancement**

Thank You