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Eroding Trust

Contact Tracing Technologies in Israel

Eran Toch

Rethinking Privacy and Mass
Surveillance in the Information Age

Paper Series by the Israel Public
Policy Institute and the Heinrich
Böll Foudnation

Eroding Trust

Contact Tracing Technologies in Israel

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About the Project

The following paper has been commissioned by the Heinrich Böll Foundation and the Israel Public Policy Institute (IPPI) as part of the paper series *"Rethinking Privacy and Mass Surveillance in the Information Age."* Against the backdrop of the COVID-19 pandemic, this publication series has set out to examine the societal and political implications of the spillover of surveillance technologies from the security sphere into everyday life.

About the German-Israel Tech Policy Dialog Program

The paper series *"Rethinking Privacy and Mass Surveillance in the Information Age"* is part of the German-Israeli Tech Policy Dialog program of the Heinrich Böll Foundation and the Israel Public Policy Institute (IPPI). By facilitating a collaborative space for researchers and practitioners from politics, academia, tech and civil society, the program sets out to cultivate a community of committed professionals from both countries to deliberate the impact and governance of emerging technologies and to generate new actionable insights in support of democratic values.

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Executive Summary

Contact tracing technologies can potentially help health organizations and governments stop the spread of COVID-19 by finding and isolating people who have been in contact with Coronavirus carriers. However, they also pose serious threats to privacy, as they are based on identifying and analyzing contacts between individuals. Also, their effectiveness depends heavily on people's behavior, particularly on the proportion of people who install and use the technology. This behavior may be influenced by people's perceptions of the technologies' utility or by their perceptions of the potential privacy threats that may originate from personal information collection. The fast pace of the deployment of these technologies puts individuals into "privacy shock": the need to immediately form an attitude regarding a new privacy threat and to determine the tradeoff between privacy and utility.

This report analyzes two contact tracing technologies that were introduced by the Israeli government during the early days of the Coronavirus crisis: a privacy-preserving mobile application ("HaMagen," meaning "the Shield" in Hebrew) and centralized cellular tracking by Israel's General Secret Service ("The Tool"). The two technologies provide a natural experiment that examines how the characteristics of surveillance technologies shape user's "privacy shock." We explore how these characteristics affect the way people interact with these technologies, as well as their overall success. In this case study, we first analyze the technologies' architectures and the privacy threats they pose. We then point to the possible effects that privacy concerns have on the success of contact tracing technologies.

1. Introduction

The novel Coronavirus has led to a global pandemic that seriously threatens the health and well-being of billions of people. Given the absence of a vaccine or a cure, health authorities are turning to non-medical interventions, such as case isolation and quarantine, social distancing and hygiene measures, to reduce virus transmission. The pandemic puts pressure on governments to develop new policies, mechanisms, and technologies, in ways that would have been deemed quite inconceivable before the pandemic. In this report, we are focusing on contact tracing technologies (CTTs), which identify people who might have been exposed to COVID-19 positive people and aim to isolate them before they spread the virus further.

> **Countries differ in terms of the type of technologies they develop, the way they frame and regulate CTTs, the way citizens react and behave with the given technology, and the overall success of the technology in curbing the spread of the epidemic.**

The Coronavirus crisis has highlighted how different governments are responding. Countries differ in terms of the type of technologies they develop, the way they frame and regulate CTTs, the way citizens react and behave with the given technology, and the overall success of the technology in curbing the spread of the epidemic.

This case study of contact tracing in Israel is fascinating for several reasons. First, Israeli citizens interacted with two types of contact tracing technologies: voluntary and involuntary. This creates a "natural experiment" in which we can assess how people respond and form their points of view regarding a new tracking technology. These circumstances also allow us to examine a phenomenon we will call "privacy shock": a situation in which citizens have to respond immediately to a new privacy challenge. Understanding this phenomenon can be helpful in designing and evaluating large scale technological public health interventions during this global pandemic. More generally, the case study can help policymakers recognize important aspects of surveillance technologies that are sometimes overlooked: specifically, the negative externalities of surveillance, which are not always apparent, leaving the discourse murky and unfocused. The concept of a "privacy shock" can help us focus our attention and isolate various effects that are otherwise hidden.

2. Contact Tracing Technologies

CTTs are central to curbing the spread of the virus, by quickly identifying infected people (usually those who have symptoms), gathering information about their recent contacts and ordering those contacts to self-quarantine, in order to interrupt further transmission of the epidemic[1]. Contact tracing is not new: It has been used to prevent the spread of epidemical diseases such as HIV, Ebola and tuberculosis. The widespread nature of the COVID-19 crisis and the explosion of mobile smartphone adoption have led to an intense effort to design and deploy CTTs that is unprecedented in scale and sophistication.

The effectiveness of CTTs is under serious debate. Simulation-based studies have shown that CTTs can be effective in epidemiological models, with the potential of bringing epidemics under control

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if contacts of positive cases are isolated quickly enough[2]. If the adoption rates are high enough, the combination of isolation and contact tracing/quarantining can bring R, the effective reproduction number, below 1 and, therefore, effectively control the epidemic[3]. However, other analyses have shown that introduction of CTTs can reduce the number of transmissions also at fairly low levels of uptake, while minimizing the impact on the rest of the population[4].

3. Typology of CTT Architectures

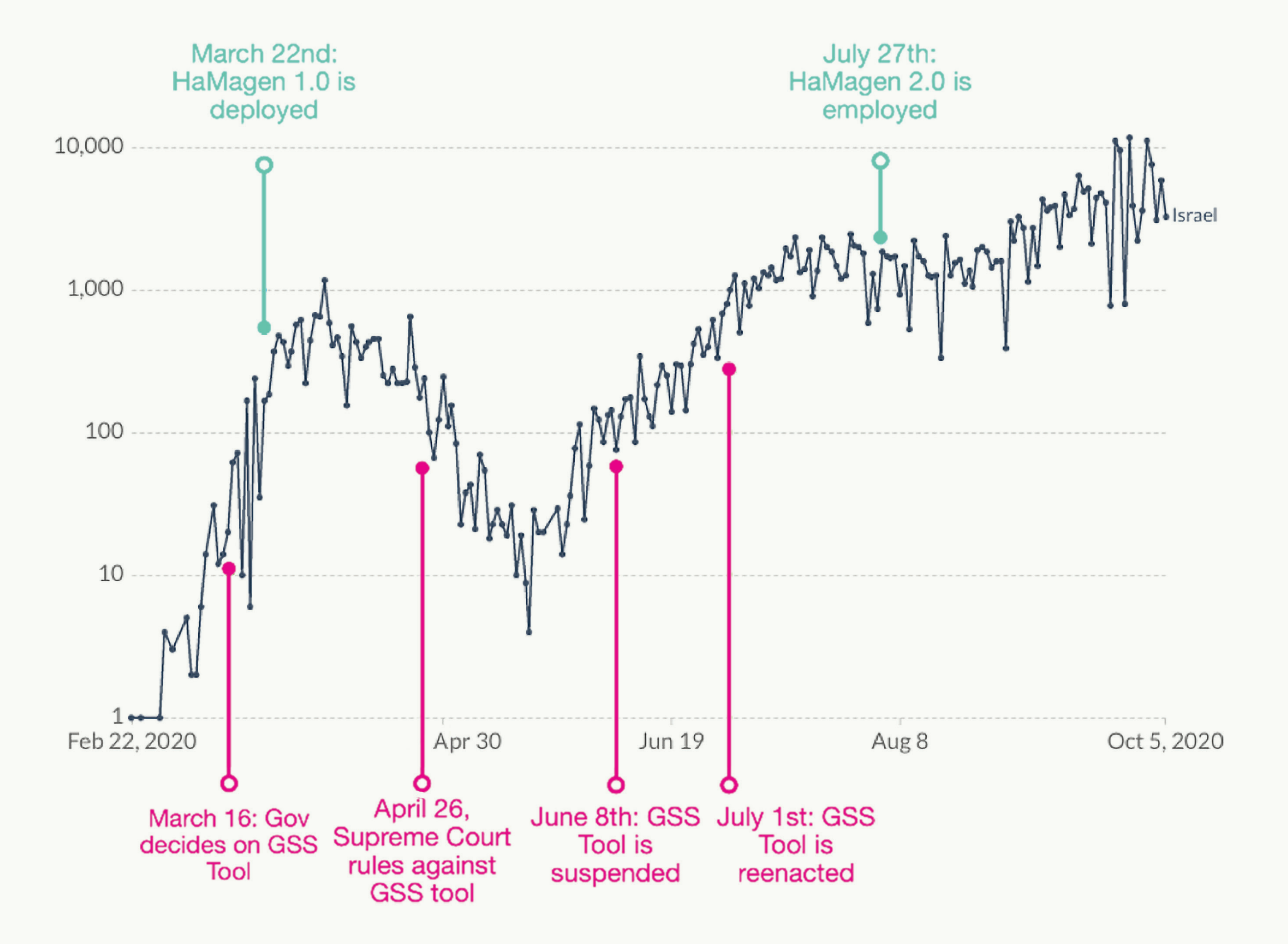
Many countries have developed and deployed various types of CTT[5].

> **These technologies can be distinguished by how centralized they are, how much control they provide to the user, how they infer contacts between people and how they handle personal information privacy.**

The most crucial distinction can be made between voluntary and non-voluntary designs. Most CTTs rely on voluntary participation, in which individuals need to download and install an app on their phones. Singapore's TraceTogether App uses Bluetooth Low Energy (BLE)[6] and local matching with official data about the locations of infected people. Some countries employ involuntary CTT designs. For example, South Korea[7] and Israel (in addition to its use of voluntary CTT),[8] rely on cellular traces from mobile carriers for tracking contacts. Other CTTs are used in ways that make installation practically mandatory, such as the Chinese Tencent app, which regulates access to public areas[9]. CTTs can employ different types of privacy enhancing technologies. For example, the Google/Apple COVID-19 Exposure Notification API uses random BLE signals, which provide a certain level of anonymity to contact tracing[10].

Figure 1.

Timeline of Implementation of Contact Tracing Technologies in Israel



Milestones in the application of the two Israeli contact tracing technologies, juxtaposed on a graph of the number of new daily COVID-19 cases in Israel (on a logarithmic scale).

3.1. The HaMagen Contact Tracing App

In Israel, two contact tracing technologies have been implemented during the Coronavirus pandemic: HaMagen ("the Shield," in Hebrew), a contact tracing application that was developed by the Ministry of Health, and centralized cellular tracking that is operated by Israel's General Security Services (GSS), dubbed "The Tool." HaMagen was deployed on March 22, 2020.[11] The first version, HaMagen 1.0, was based on ongoing local storage of users' location data, and local matching with official data about infected people's whereabouts. In the second version, HaMagen 2.0, deployed on July 28,[12] had added BLE support (but without using the Google/Apple COVID-19 Exposure Notification API).

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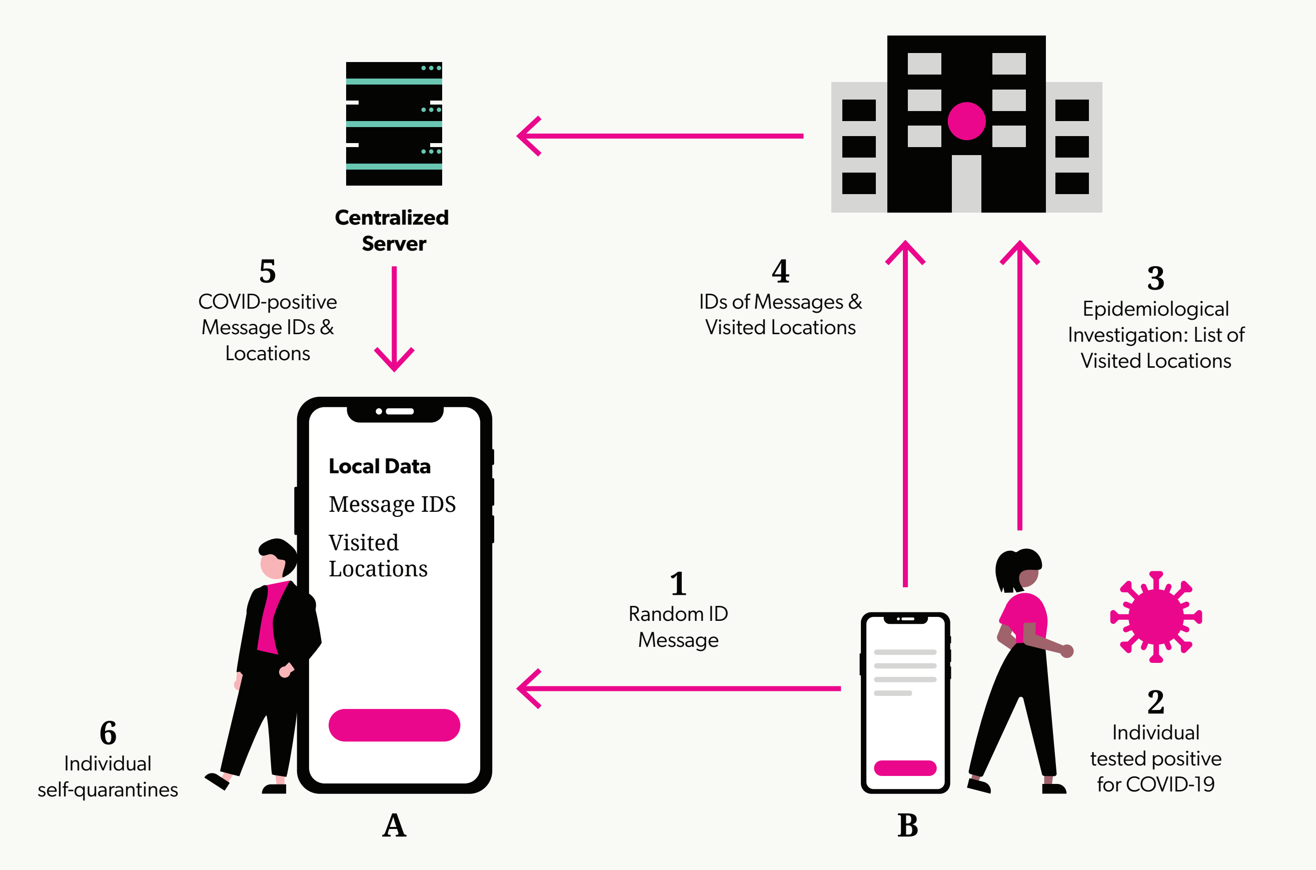
Figure 2.

Architecture of the HaMagen Contact Tracing App


Centralized Server
5
COVID-positive Message IDs & Locations
4
IDs of Messages & Visited Locations
3
Epidemiological Investigation: List of Visited Locations
Local Data
Message IDS
Visited Locations
1
Random ID Message
6
Individual self-quarantines
2
Individual tested positive for COVID-19
A
B

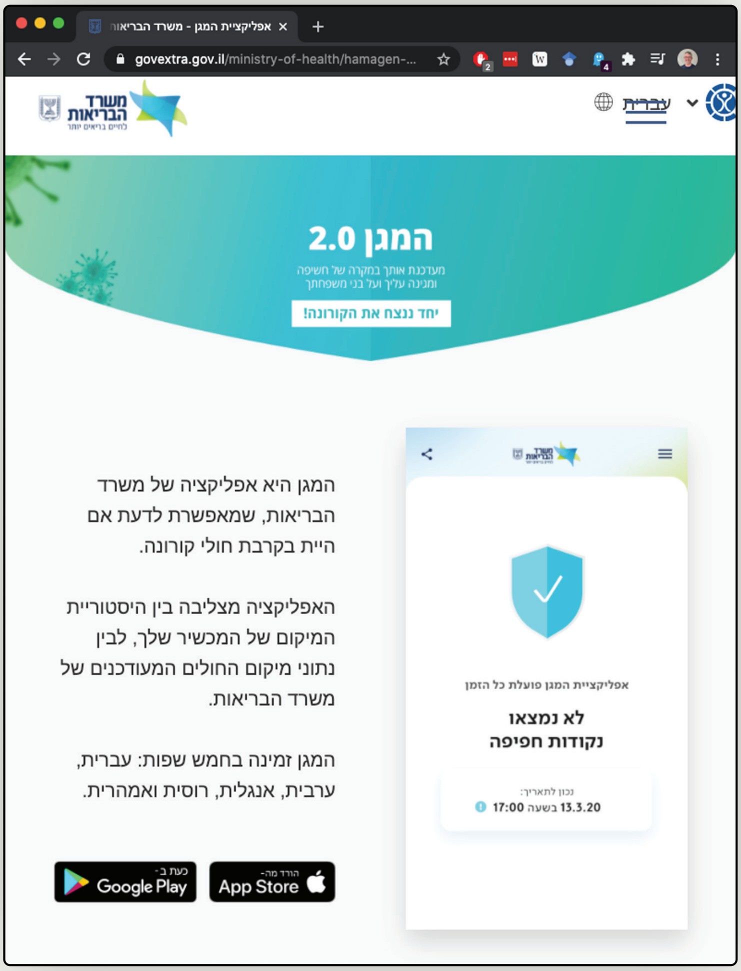
The contact tracing process in HaMagen can be divided into two stages: ongoing data collection and handling of epidemiological isolation. Under normal circumstances, the app collects information about the visited locations (using the mobile phone's GPS and Wi-Fi positioning capabilities). Beginning with HaMagen 2.0, the app also receives messages from nearby phones through BLE. These messages contain randomly assigned IDs, and theoretically cannot be used to identify the nearby phone.

When an individual is identified as COVID-19 positive, they are briefed by an epidemiological investigation team. The locations they visited within the past two weeks are fed into a simple centralized server. If the individual has the HaMagen app installed, they can decide to upload the locations and BLE messages to the server. Each app regularly retrieves the list of locations and message IDs. If there is a match with the locations or the messages received from a COVID-19 positive person, the user is notified and is asked to contact the health authorities.

Links to download HaMagen 1.0 were available on the Health Ministry Website, but it was not widely promoted in the media. Even with limited exposure, about 1.5 million people have downloaded the app, and 400,000 people have uninstalled it, according to the Health Ministry's response to a Supreme Court appeal.[13] However, the second version was only downloaded by 22,000 people, and by then most users have uninstalled the first version[14].

Image 1.

HaMagen Website and Screenshot of the App



המגן 2.0

מעדכנת אותך במקרה של חשיפה
ומגינה עליך ועל בני משפחתך

המגן היא אפליקציה של משרד
הבריאות, שמאפשרת לדעת אם
היית בקרבת חולי קורונה.

האפליקציה מצליבה בין היסטוריית
המיקום של המכשיר שלך, לבין
נתוני מיקום החולים המעודכנים של
משרד הבריאות.

המגן זמינה בחמש שפות: עברית,
ערבית, אנגלית, רוסית ואמהרית.

אפליקציית המגן פועלת כל הזמן

לא נמצאו
נקודות חפיפה

נכון לתאריך:
13.3.20 בשעה 17:00

3.2. GSS Cellular Tracking

The second technology, The Tool, is based on centralized cellular tracking operated by Israel's General Security Services (GSS). This technology is based on the surveillance of all of the cellular phones operating in Israel through the cellular companies' data centers.[15] According to news sources, it routinely collects information from cellular companies and identifies the location of all phones through cellular antenna triangulation and GPS data, but only makes use of it with a court order.[16] The Israeli government authorized the use of this technology for contact tracing on March 16, 2020, claiming that the GSS is the only entity that has the means to quickly and efficiently deploy contact tracing technology.[17] Due to petitions to Israel's High Court of Justice, the government suspended use of The Tool on June 8, but then reinstated it under temporary statutory provisions on July 1, 2020.[18] On July 20, a supplementary bill was enacted that authorized the GSS to use The Tool, as long as the number of new confirmed cases is higher than 200.[19]

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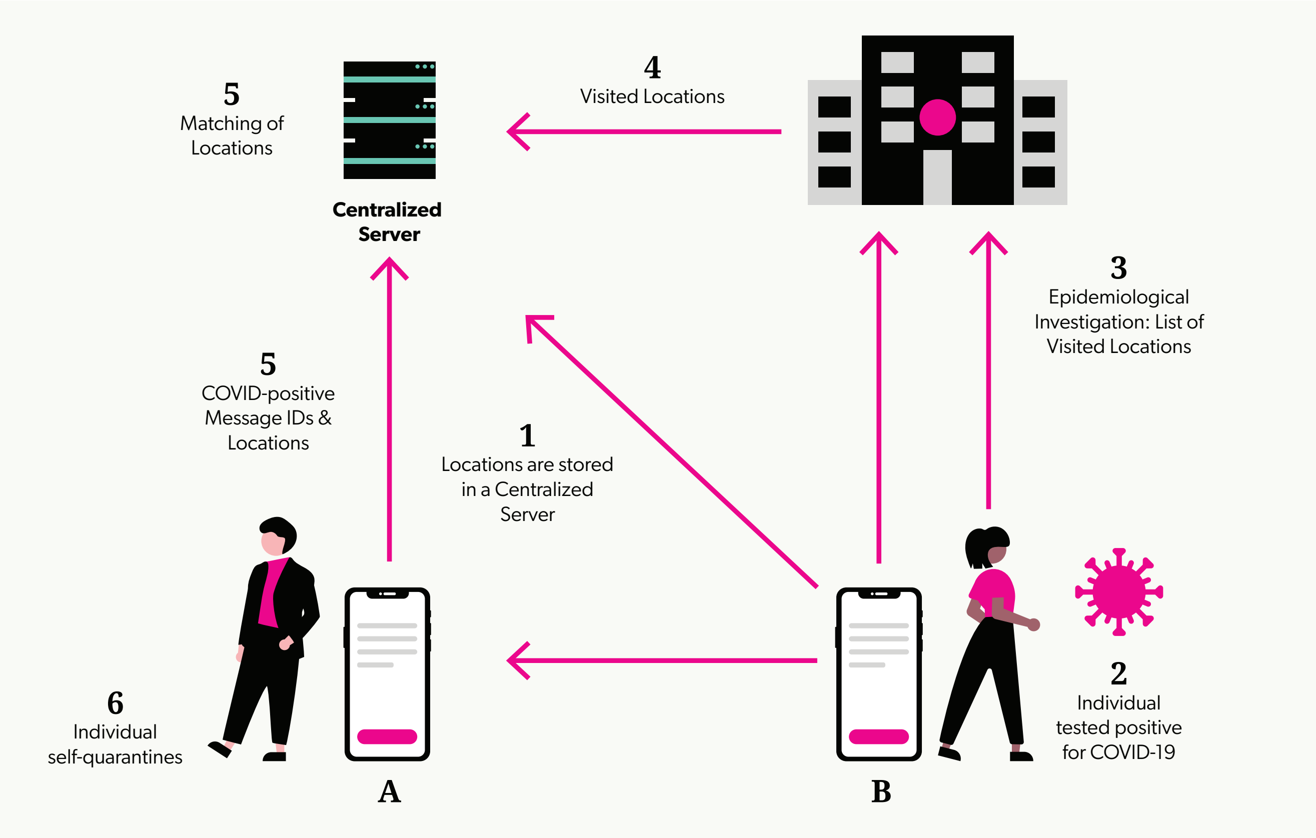
Figure 3.

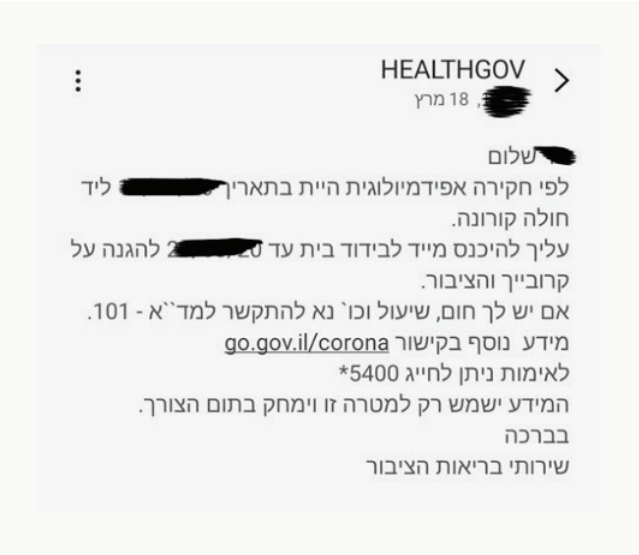
Architecture of the GSS Cellular Tracing Technology (“The Tool”)


5
Matching of Locations
Centralized Server
4
Visited Locations
3
Epidemiological Investigation: List of Visited Locations
5
COVID-positive Message IDs & Locations
1
Locations are stored in a Centralized Server
6
Individual self-quarantines
A
B
2
Individual tested positive for COVID-19

The Tool’s contact tracing process is based on constant location tracking carried out through Israel’s cellular companies. As illustrated in Figure 3, every cell phone’s location is tracked using a mixture of GPS locations transmitted through cellular protocols and cellular antenna triangulation. When an individual is identified as COVID-19 positive, they are briefed by the epidemiological investigation teams, and the locations they visited during the previous two weeks are fed into The Tool. Following instructions given by the health authorities, the system analyzes the location data and pinpoints individuals who were in close proximity to the COVID-positive person. Contact details for individuals identified by The Tool are then sent to the health authorities, who notify them via text message (see Image 2) that they must self-quarantine. The system does not let people know the location or the exact time of their interaction with the infected individual.

Image 2.

Text Message from the Ministry of Health


HEALTHGOV
[redacted], 18 מרץ

[redacted] שלום
לפי חקירה אפידמיולוגית היית בתאריך [redacted] ליד
חולה קורונה.
עליך להיכנס מייד לבידוד בית עד [redacted] להגנה על
קרובייך והציבור.
אם יש לך חום, שיעול וכו` נא להתקשר למד``א - 101.
מידע נוסף בקישור go.gov.il/corona
לאימות ניתן לחייג 5400*
המידע ישמש רק למטרה זו וימחק בתום הצורך.
בברכה
שירותי בריאות הציבור

With this message, the recipient is informed that, according to an epidemiological investigation, they have been in close proximity to a verified Coronavirus patient and must enter home quarantine.

4. Privacy Analysis of the Technologies

In the short time since CCTs have been developed, we have seen several distinct architectures, with very different implications for privacy. The design of CTTs varies and can include the collection and processing of personally identifying information about people's location, their movements, and their contacts.

> **Contact tracing, especially if involuntary, has an immediate and substantial negative impact on citizens' privacy, which may affect their trust in the government and sense of social solidarity.**

To analyze the potential privacy harms, we turn to a meta privacy engineering approach that analyzes the system's data flows, protections and potential harms.[20] The criteria for analyzing the privacy impact are based on questions relating to four categories:

- User Sphere Data: what data is gathered by the CCT and is controlled by the user?
- System Sphere Data: what data is gathered by the CCT and is controlled by the system?
- User Control: can users control their personally identifiable information, and if so, how?
- Privacy protections: which additional privacy protections are in place, such as policies and oversight?

Table 1.

Privacy Analysis of HaMagen and the GSS Tool

Technology	User Sphere Data	System Sphere Data	User Control	Privacy Protections
HaMagen	Device and app history, location, Wi-Fi connection, full network access, prevent device from sleeping, change network connectivity	Locations of people who have tested positive for COVID-19	Users can actively decide whether to install the app, contact health authorities, or share locations with the system	Location information is not shared without user actions. Location matching is not tracked by the system
GSS Tool	None: no information is stored or accessed by users	The system tracks and stores the locations of all cellular subscribers. No exact information is known about the accuracy of and additional information that is stored	No user control over data collection. Users can appeal quarantine orders by calling the Health Ministry	Legal obligations with GSS oversight

The analysis of the contact tracing technologies displayed in Table 1 shows the fundamental dissimilarities between the technologies. The main difference stems from the distinct architectures. HaMagen keeps the data on the phone, which means that the data is saved almost exclusively in the user sphere, while the GSS tool collects locations (and possibly other information), all from the system sphere. HaMagen's architecture, which is based on saving and matching information in the user sphere, provides users with a greater level of control. Users can decide whether to install the app, to quarantine, and to share their locations if they have tested positive for COVID-19. The GSS Tool, on the other hand, provides no level of individual control, a fact that led Israel's Supreme Court to require direct and specific legislation to authorize use of the Tool.[21]

> **The main difference stems from the distinct architectures. HaMagen keeps the data on the phone, which means that the data is saved almost exclusively in the user sphere, while the GSS tool collects locations (and possibly other information), all from the system sphere. HaMagen's architecture, which is based on saving and matching information in the user sphere, provides users with a greater level of control.**

5. Human Behavior and Deployment

The actual effectiveness of CTTs is heavily dependent on people's choices and behaviors. Effective use of voluntary CTTs requires enough people to download, authorize and configure the applications.[22] Users must authorize access to their phone's GPS and Bluetooth data. Non-voluntary CTTs require citizens to carry a mobile phone on them to be effective. Therefore, to understand how useful CTTs can be in limiting the spread of COVID-19 and other infectious diseases, we need to understand the factors that impact their adoption and use.

Specifically, we know that privacy concerns may negatively affect people's willingness to use voluntary CTT solutions. Users often refrain from using or limiting the permissions of mobile applications if they deviate from privacy norms.[23] Privacy has a complex and sometimes unpredictable effect on behavioral equilibrium processes,[24] which might lead to low adoption of CTTs that, in turn, is likely to considerably reduce their effectiveness. To counter this problem, CTTs should be designed ex-ante to incorporate strong privacy guarantees.

> **To understand how useful CTTs can be in limiting the spread of COVID-19 and other infectious diseases, we need to understand the factors that impact their adoption and use.**

Several early studies have portrayed a contradictory picture of user attitudes towards CTTs. In a survey carried out in the United Kingdom, the United States, France, Germany and Italy, Milsom et al. have shown that 75% of all respondents declared they would "definitely install" contact tracing apps.[25] On the other hand, of a representative sample of 2,000 people in the United States, just over 30% of Americans indicated they would download and use a mobile contact tracing app.[26] Contradictions have also arisen in the results of studies that evaluated the effect of privacy-oriented design on user approaches. Li et al. used a vignette study design that did not find a relation between privacy-focused designs and willingness to install the application.[27] Paradoxically, participants preferred to install apps that use a centralized server for contact tracing, rather than designs that provided more privacy protection through decentralized architectures. On the other hand, Zhang et al. found significantly higher levels of support for apps that offer privacy protections.[28] Similarly, Kaptchuk et al. carried out several surveys in the United States that showed how perceptions of health benefits and degree of privacy risk influence people's willingness to install contact tracing apps.[29]

5.1. Installations of Contact Tracing Apps

To analyze installations and attitudes towards contact tracing technologies in Israel, we conducted an online survey between May 4 and May 7, 2020, that took approximately 15 minutes to complete. A total of 563 participants completed the entire survey. We used quota stratified sampling to approximate the marginal distributions of key demographic characteristics: religion/ethnicity, gender and age.

About 32% of our respondents reported that they had installed the HaMagen application, and 9% installed and then uninstalled it. The former figure is higher than the officially reported number of 1.58 million people who installed the app in Israel. One possible explanation is that our study

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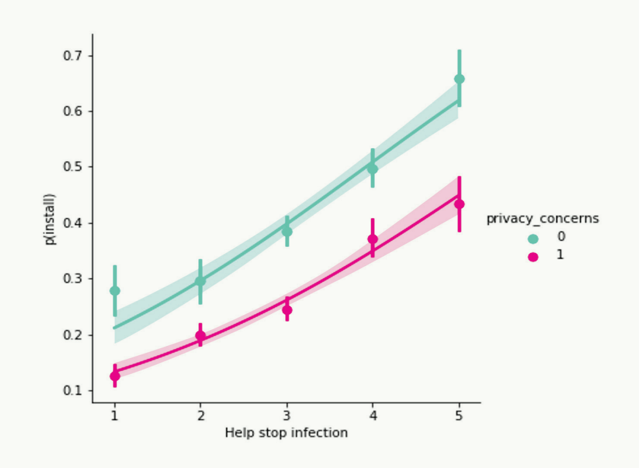
population has more years of academic education than average. Of the rest, about 20% reported that they had not heard about the app. The rest heard about it but chose not to install it.

To analyze the factors that contribute to installing the application, we only looked at those people who have either never installed the app or who currently have it on their phones. We fitted a logistic regression model to the installation variable. The likelihood of installing the app is positively correlated with the perceived community utility of the application and negatively correlated with people's privacy concerns. As Figure 4 shows, there is a strong positive relationship between the perceived utility and the probability of installing the app. Each increase of one unit in the belief in the utility of the app increases the probability of installation by 2.3 units. Moreover, each increase of one unit of privacy concern reduces the probability of installation by 0.6 units. Other attitudes were not found to be significant. Specifically, attitudes towards the pandemic, in general, were not found to affect installation, nor trust in leaders or even following health instructions.

Figure 4.

Perceived Utility and the Probability of Installing the App



The figure shows the positive relationship between the belief that the app can hinder the pandemic and the probability of installing the app, among those with higher concerns for privacy (in pink) and lower privacy concerns (in turquoise) compared to the median.

5.2. Privacy and Deployment

We compared attitudes towards HaMagen to attitudes towards the GSS's centralized cellular contact tracing technology. Overall, we did not find statistically significant differences in the approaches towards privacy between the two architectures. As Figure 5 (left) shows, the medians and variances visually look very similar. A Wilcoxon sum test did not find significant differences (W=17499.0, p=0.15). The differences between the perceived utility are statistically significant, but the effect size is rather small. As Figure 5 (right) shows, the median utility is identical, but more participants believe that cellular tracing offers more utility (Wilcoxon sum test, W=18579.5, p=0.018).

These findings show that privacy perceptions are important to the installation of contact tracing apps. If we can convince people that technology does not track them and threaten their privacy, they may be more inclined to install it. However, convincing users is not easy. Users do not distinguish between privacy threats from a centralized cellular-tracking app and those from a voluntary app. This result confirms the hypothesis that the government has not communicated their privacy advantages well enough.

People have little trust in involuntary contact tracing. Their lack of trust might have real consequences, given the growing acceptance of behaviors such as avoiding carrying cell phones. If many people refrain from carrying their phones, the system's overall accuracy would deteriorate. People also indicated low levels of trust that the government will follow through with the deletion of the data that has been collected once the pandemic has abated, which may also push people to limit their cell phone use.

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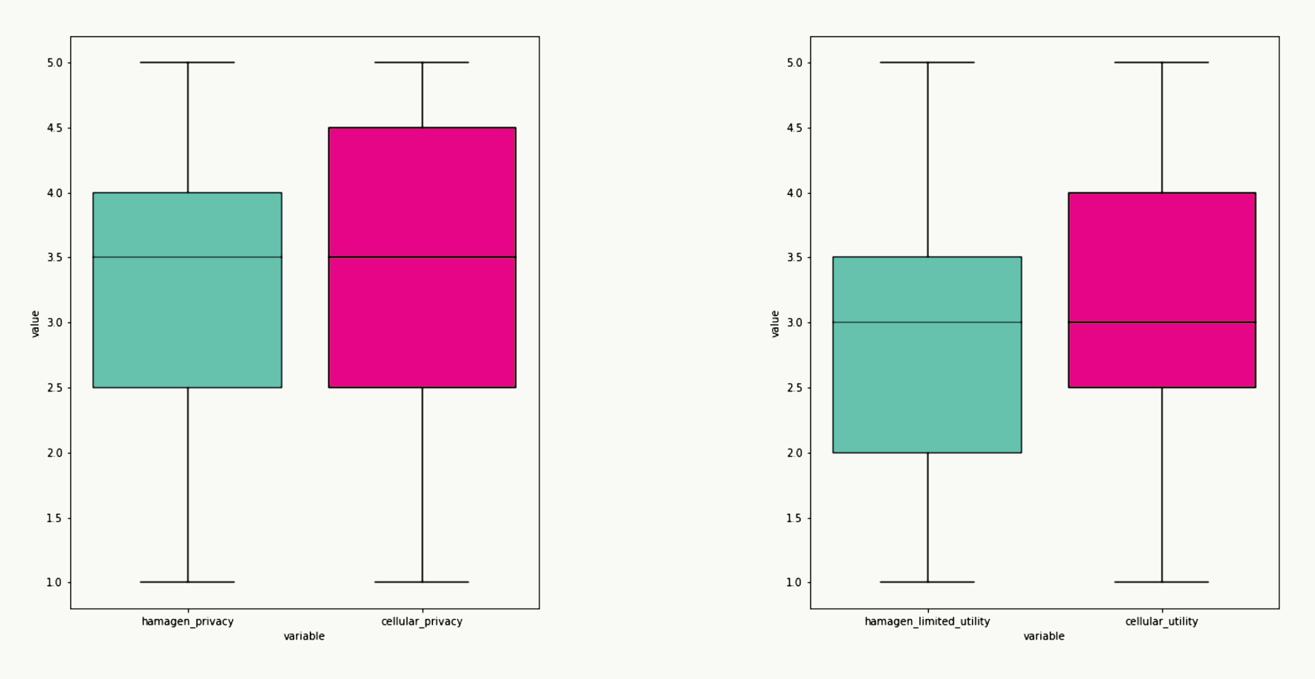
Figure 5.

Privacy Concerns and Perceived Utility



Comparison between the HaMagen application (in turquoise) and cellular tracking (in pink) with regards to their perceived utility (graph on the right) and the privacy concerns they evoke (graph on the left).

5.3. Mitigating Errors

The Israeli experience with contact tracing technologies also sheds light of the some of their shortcomings. The GSS Tool redeployment in July 2020 has led to revelations concerning the weakness of centralized contact tracing. During the first week of deployment, 70,949 people received text messages from the Ministry of Health notifying them that they had been in contact with a person carrying the Coronavirus and thus had to self-quarantine. Of them, 70,051 were identified solely by the GSS.[30] Many individuals who received this notification thought that they were misidentified as having been in contact with a person with Coronavirus. Many were not told where the contact reportedly took place, and at the beginning of the redeployment there was no way to appeal the quarantine order.[31] When an appeal mechanism was set up a few days after the deployment, the Ministry of Health Hotline was overwhelmed by phone calls. These events led to increasing acknowledgement in the media and among the public that the GSS's tool was not as accurate and as useful as it was claimed to be.

The errors in identification and the public's problematic interaction with the technology led to an erosion of trust in contact tracing and in the government's response to the pandemic. According to the State Comptroller's October 27 report, 3.5% to 4.7% of those told to quarantine based on the GSS's surveillance methods contracted the Coronavirus, compared with 24% of those told to quarantine by an epidemiological investigation team.[32] The Tool unnecessarily sent

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into quarantine three to eight times as many people than epidemiological studies.

> **The errors in identification and the public's problematic interaction with the technology led to an erosion of trust in contact tracing and in the government's response to the pandemic.**

According to the Health Ministry, about 60% of the appeals against self-quarantine orders due to contact with a verified Coronavirus patient were granted.[33] The sheer number of acknowledged errors led to mistrust in the technology's accuracy and specificity. At the same time, the lack of explanations and accountability from the GSS created a lack of engagement and a sense of resentment.[34] News outlets have reported on calls for citizens to avoid bringing their phones to demonstrations[35] and other public events. This failure correlates with and further contributes to a lack of trust in the authorities managing the pandemic. A survey conducted by the Israel Democracy Institute in mid-July 2020 shows a collapse in public trust towards both the Prime Minister and the health authorities.[36] Health officials report that they believe that about 50% of people who are supposed to be in quarantine are ignoring the requirement.[37] The last point demonstrates the importance of public trust. Even if cellular tracking identifies all transmissions, how useful can it be if people don't trust it?

6. Conclusions

Israel responded to the pandemic by quickly deploying surveillance and tracking technologies. Stopping the spread of the Coronavirus, with its health, economic and political implications, has become an urgent task for health authorities. However, even though surveillance technologies may seem to be a "silver bullet" in a fight against a pandemic that spreads through interactions between individuals, our analysis here reveals a much more complicated picture.

The Israeli case study shows that even if the road to mass surveillance is a quick one, it might not lead to better outcomes.

> **Deploying these technologies rapidly, during the uncertainty of the pandemic, led to a "privacy shock," with citizens, government and organizations struggling to understand and assess the new informational norms.**

In Israel, we found that citizens have difficulties in differentiating between the HaMagen app and The Tool, even though their impact on privacy is dramatically different. Overall, we see that privacy has a substantial effect on people's decisions to install applications and in the way they adjust their behavior to the new technologies.

The Israeli case study shows that contact tracing requires strong cooperation from citizens. People need to install applications, take their phones when they go outside, give truthful answers when briefed, self-quarantine themselves when they are asked to, and make many other diverse and difficult decisions. As attitudes towards The Tool demonstrate, when trust in the procedure erodes, people's behavior can drive down the effectiveness of the technology. We see that Israel's decision to rely on involuntary mass surveillance did not lead to containing the Coronavirus pandemic. Privacy concerns and an erosion of trust have led people to engage in insurgent behaviors, such as leaving their phones at home and uninstalling

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applications. Unfortunately, these attitudes towards the GSS Tool also seem to have a spillover effect on more privacy-minded technologies, such as the MaHagen app. Overall, the Israeli case study can be seen today, in Fall 2020, as a cautionary tale about alienating citizens while failing to reap the promised health benefits.

Endnotes

[1] R. Jalabneh, H. Zehra Syed, S. Pillai, E. Hoque Apu, M. R. Hussein, R. Kabir, S. Arafat, and M. Azim Majumder. Use of Mobile Phone Apps for Contact Tracing to Control the COVID-19 Pandemic: A Literature Review, 2020. https://dx.doi.org/10.2139/ssrn.3641961.

[2] J. Hellewell, S. Abbott, A. Gimma, N. I. Bosse, C. I. Jarvis, T. W. Russell, J. D. Munday, A. J. Kucharski, W. J. Edmunds, F. Sun, S. Flasche, B. J. Quilty, N. Davies, Y. Liu, S. Clifford, P. Klepac, M. Jit, C. Diamond, H. Gibbs, K. van Zandvoort, S. Funk, and R. M. Eggo. Feasibility of controlling Covid-19 outbreaks by isolation of cases and contacts. The Lancet Global Health 8(4): e488–96, 2020;

M. J. Keeling, T. D. Hollingsworth, and J. M. Read. The efficacy of contact tracing for the containment of the 2019 novel coronavirus (Covid-19). medRxiv, 2020. https://doi.org/10.1101/2020.02.14.20023036.

[3] R. Hinch, W. Probert, A. Nurtay, M. Kendall, C. Wymant, M. Hall, and C. Fraser. Effective configurations of a digital contact tracing app: A report to NHSX, 2020. https://cdn.theconversation.com/static_files/files/1009/Report_-_Effective_App_Configurations.pdf?1587531217;

L. Ferretti, C. Wymant, M. Kendall, L. Zhao, A. Nurtay, L. Abeler-Dörner, M. Parker, D. Bonsall, and C. Fraser. Quantifying SARS-CoV-2 transmission suggests epidemic control with digital contact tracing. Science, 368(6491), 2020. http://doi.org/10.1126/science.abb6936.

[4] K. Servick. Covid-19 contact tracing apps are coming to a phone near you. How will we know whether they work? Science, 2020. https://www.sciencemag.org/news/2020/05/countries-around-world-are-rolling-out-contact-tracing-apps-contain-coronavirus-how.

[5] Jalabneh et al., 2020; Hinch et al, 2020.

[6] TraceTogether: safer together join 1,600,000 users in stopping the spread of covid-19 through community-driven contact tracing, Apr 2020. https://www.tracetogether.gov.sg/.

[7] R. Shaw, Y.-k. Kim, and J. Hua. Governance, technology and citizen behavior in pandemic: Lessons from Covid-19 in East Asia. Progress in disaster science, page 100090, 2020. https://doi.org/10.1016/j.pdisas.2020.100090

[8] J. Tidy, Coronavirus: Israel enables emergency spy powers, BBC News, March 17th, 2020. https://www.bbc.com/news/technology-51930681.

[9] P. Mozur, R. Zhong, and A. Krolik. In coronavirus fight, china gives citizens a color code, with red flags, New York Times, March 1st, 2020. https://www.nytimes.com/2020/03/01/business/china-coronavirus-surveillance.html.

[10] C. Troncoso, M. Payer, J.-P. Hubaux, M. Salathé, J. Larus, E. Bugnion, W. Lueks, T. Stadler, A. Pyrgelis, D. Antonioli, et al. Decentralized privacy-preserving proximity tracing. arXiv preprint arXiv:2005.12273, 2020;

R. Canetti, A. Trachtenberg, and M. Varia. Private colocation discovery: Taming the coronavirus while preserving privacy. arXiv preprint arXiv:2003.13670, 2020.

[11] Hamagen – the ministry of health app for fighting the spread of coronavirus, Apr 2020. https://govextra.gov.il/ministry-of-health/hamagen-app/download-en/.

[12] D. Globerman, Drop everything and install the HaMagen 2.0 app [in Hebrew], Mako, July 28th, 2020. https://www.mako.co.il/nexter-news/Article-da141fa82249371027.htm.

[13] Y. Friedson. Health Ministry live from the supreme court: The shin bet tracking will be extended as the lockdown is lifted [in Hebrew], Ynet, April 16th, 2020. https://www.ynet.co.il/articles/0,7340,L-5715439,00.html;

A. Grinzaig. On the request of Globes, the Supreme Court decision was live streamed [in Hebrew], Globes, April 16th, 2020. https://www.globes.co.il/news/article.aspx?did=1001325439.

[14] U. Berkovitch, HaMagen did not take off: what tripped the Israeli Corona app [in Hebrew], Globes, September 17th, 2020. https://www.globes.co.il/news/article.aspx?did=1001343009.

[15] A. Kaplan Sommer, Israel unveils open source app to warn users of coronavirus cases, Haaretz, March 23rd, 2020. https://www.haaretz.com/israel-news/israel-unveils-app-that-uses-tracking-to-tell-users-if-they-were-near-virus-cases-1.8702055;
R. Bergman and I. Schwarztuch, 'The Tool' is Exposed: The GSS's Secret Database that Collects Your Text Messages, Calls, and Location [in Hebrew], Yedioth Ahranoth, March 27th, 2020, https:// www.yediot.co.il/articles/0,7340,L-5701611,00.html.

[16] The General Security Service Law 5662-2002, Israeli Knesset. https://knesset.gov.il/review/data/eng/law/kns15_GSS_eng.pdf.

[17] Mozur et al., 2020.

[18] T. Shwartz Altshuler and R. Aridor Hershkowitz, Digital contact tracing and the coronavirus: Israeli and comparative perspectives, Brookings Institute, August 2020, https://www.brookings.edu/research/digital-contact-tracing-and-the-coronavirus-israeli-and-comparative-perspectives/.

[19] J. Lis, GSS Monitoring Law Approved: The government will have to approve the operation of the placements every 21 days [in Hebrew], Haaretz, 20th July, 2020. https://www.haaretz.co.il/news/politi/.premium-1.9007183.

[20] E. Toch, C. Bettini, E. Shmueli, L. Radaelli, A. Lanzi, D. Riboni, and B. Lepri. The privacy implications of cyber security systems: A technological survey. ACM Computing Surveys (CSUR) 51, no. 2 (2018): 1-27.

[21] Friedson, 2020; Grinzaig, 2020.

[22] Hinch et al, 2020; Hellwell et al., 2020.

[23] A. P. Felt, S. Egelman, & D. Wagner. I've got 99 problems, but vibration ain't one: a survey of smartphone users' concerns. In Proceedings of the second ACM workshop on Security and privacy in smartphones and mobile devices (pp. 33-44), 2012.

[24] R. Cummings, K. Ligett, M. M. Pai, and A. Roth. The strange case of privacy in equilibrium models. arXiv. https://arxiv.org/pdf/1508.03080.pdf.

[25] L. Milsom, J. Abeler, S. Altmann, S. Toussaert, H. Zillessen, and R. Blasone. Survey of acceptability of app-based contact tracing in the UK, US, France, Germany and Italy. 2020.

[26] B. Zhang, S. Kreps, and N. McMurry. Americans' perceptions of privacy and surveillance in the covid-19 pandemic. 2020. https://osf.io/9wz3y/

[27] T. Li, C. Faklaris, J. King, Y. Agarwal, L. Dabbish, J. I. Hong, et al. Decentralized is not risk-free: Understanding public perceptions of privacy-utility trade-offs in covid-19 contact-tracing apps. arXiv preprint arXiv:2005.11957, 2020.

[28] Zhang et al., 2020.

[29] G. Kaptchuk, E. Hargittai, and E. M. Redmiles. How good is good enough for Covid-19 apps? The influence of benefits, accuracy, and privacy on willingness to adopt. arXiv preprint arXiv:2005.04343, 2020.

[30] Shwartz Altshuler and Hershkowitz, 2020.

[31] R. Linder, Why there are so many Errors with the GSS Tracing? And What can be done? [in Hebrew], TheMarker, July 6th, 2020. https://www.themarker.com/coronavirus/.premium-1.8973996.

[32] Comptroller Report, Operating Israel's Technological Capabilities in the Coronavirus Crisis [in Hebrew], October 27th, 2020. https://www.mevaker.gov.il/sites/DigitalLibrary/Pages/Reports/3856-2.aspx.

[33] J. Lis, About 60 Percent of Israelis' Appeals Against Quarantine Based on Digital Tracking Granted, Haaretz, July 20th, 2020. https://www.haaretz.com/israel-news/.premium-about-60-percent-of-appeals-against-quarantine-based-on-digital-tracking-granted-1.9005554.

[34] O. Kabir, Israel's Covid-19 proximity detection app rolls out, with much criticism, Calcalist, July 29th, 2020. https://www.calcalistech.com/ctech/articles/0,7340,L-3842371,00.html.

[35] Y. Yablonko, Leave your phone at home: the Soroka doctor's post, the media storm, and the GSS cellular tracking [in Hebrew], Globes, July 12th, 2020. https://www.globes.co.il/news/article.aspx?did=1001335497.

[36] T. Hermann and Or Anabi, Israeli Voice Index: Israel in Times of Corona, The Israel Democracy Institute, July 14, 2020. https://en.idi.org.il/articles/32010.

[37] T. Lev Ram, Assessment: 50% of isolated people violate their quarantine conditions [in Hebrew], Maariv, September 24th, 2020. https://www.maariv.co.il/corona/corona-israel/Article-791800.

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