Undergraduate Thesis Project

The COVID-19 Pandemic and Construction
(technical research project in Civil Engineering)

The Struggle for Digital Privacy in the United States

(sociotechnical research paper)

by

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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STS Advisor: Peter Norton, Department of Engineering and Society

General research problem

How are groups in the U.S. using data gathered from citizens to influence decisions?

For two decades, collection of vast personal user data from connected devices has been routine (Smith et al., 2012). Such data have diverse applications. Epidemiologists can use it, for example, to "track the origin and hubs responsible for the spread" of a virus (Ali, 2016). With personal data, authorities optimized public health responses to the coronavirus pandemic of 2020-22.

Social media data can be used to predict antisocial traits (Sumner, 2012). Analysis of personal data can optimize diverse kinds of decisions (Conway & O'Connor, 2016).

The COVID-19 pandemic and construction

How did COVID-19 affect construction productivity on the new UVA Student Health and Wellness Center (SHWC) jobsite?

This project is being completed in the Department of Engineering Systems and Environment with technical advisors: Diana Duran and Matt O'Malley. The collaborators on this project are Brant Flici, Hayden Hunter, Alexander Maleski, and Ryan Naddoni. The UVA Student Health and Wellness Center at the University of Virginia (UVA) was in the midst of construction when the COVID-19 pandemic began in the United States. Over the months that followed, the construction industry saw many changes in the way that construction was performed. Changes in material lead times, project schedules, prices, and productivity were some of the larger impacts the construction industry endured (Alsharef et al., 2021). For my team's project, we focused on changes in productivity. "During 2020, construction labor forces working under pandemic-driven protocols and conditions experienced a composite 8.8% loss in labor

productivity due to “Jobsite Mitigation Measures” that implemented health and safety measures to prevent exposure and/or spread of the virus” (JS Held University, 2020). The construction industry already operates on thin margins, and the sudden decrease in productivity impacted contractors around the globe. For this project, Barton Malow, the general contractor, wanted my team to uncover how productivity was affected on the SHWC jobsite, and propose a tool that can better track productivity should a catastrophic global event occur in the future.

In the current state of the construction industry, productivity tracking varies from company to company and job to job. “Even though many companies have developed their own productivity tracking systems based on their experiences and accounting systems, none have been successful in establishing common definitions and developing a survey tool that collects standard productivity data at the appropriate levels” (Park, Thomas, & Tucker, 2005). While software has developed over the years to help companies better track productivity digitally, there is yet to be a comprehensive way to efficiently track the work of multiple trades on large projects. In order to complete this project my group intends to review the documents provided to us by Barton Malow and to conduct interviews and site visits with various stakeholders including the scheduler, project manager, superintendent and various subcontractor representatives. At the end of this project we aim to have a prototype for a system that Barton Malow can use to more effectively track construction productivity on their future projects.

The Struggle for Digital Privacy in the United States

How are social groups in the U.S. fighting to protect digital privacy of U.S. citizens?

As data collectors gather vast personal information online, privacy advocates are striving to protect users’ rights to their data. Social media companies sell user data for ad targeting

(White & Boatwright, 2020). In "cybervetting," prospective employers now use personal data to screen job candidates. Users of social media in the U.S. are less likely to approve of cybervetting techniques than their counterparts in India; the difference may perhaps be attributable to culture or to differences in employment opportunities (Gruzd, Jacobson, & Dubois, 2020). During the COVID-19 pandemic, location tracking by public authorities caused widespread suspicions of data abuse. In a study, Simko et al. (2022) found that "approximately 63%" of respondents "said they would be somewhat or extremely likely to download a contact tracing app with perfect privacy, while many fewer would download an app that shared their location with their government."

Efforts to protect personal data rights online are analogous in important respects with efforts to religious liberty (Farris, 2013).

The American Civil Liberties Union (ACLU) protects digital privacy rights (*United States v. Carpenter et al,* 2015). Like the ACLU, the Electronic Privacy Information Center (EPIC) also litigates to protect digital privacy, including in the workplace (*United States v. Hamilton,* 2012). Digital privacy standards can impede law enforcement. The Electronic Frontier Foundation (EFF) also promotes digital privacy, in part through publicity. An EFF press release, for example, embeds a warning in its headline: "Data Broker Helps Police See Everywhere You've Been with the Click of a Mouse: EFF Investigation" (EFF, 2022). Like ACLU and EPIC, EFF also files lawsuits. To protect privacy, the Tor Project (Tor), a nonprofit, developed an onion routing network that anonymizes internet browsing. According to the Tor Project (2021), its mission "is to advance human rights and freedoms by creating and deploying free and open source anonymity and privacy technologies, supporting their unrestricted availability and use, and furthering their scientific and popular understanding."

To protect digital privacy, Privaterra (n.d.) collaborates with human rights organizations, solicits donations, and hosts workshops. Zcash encrypts consumers' digital transactions to protect personal information. Zcash (2021) calls itself "the 'https of blockchains,'" claiming it protects consumers' "freedom to save and spend as you like."

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