# A Preliminary Analysis of the Determinants of Acceptance of Contact Tracing Apps in Brazil

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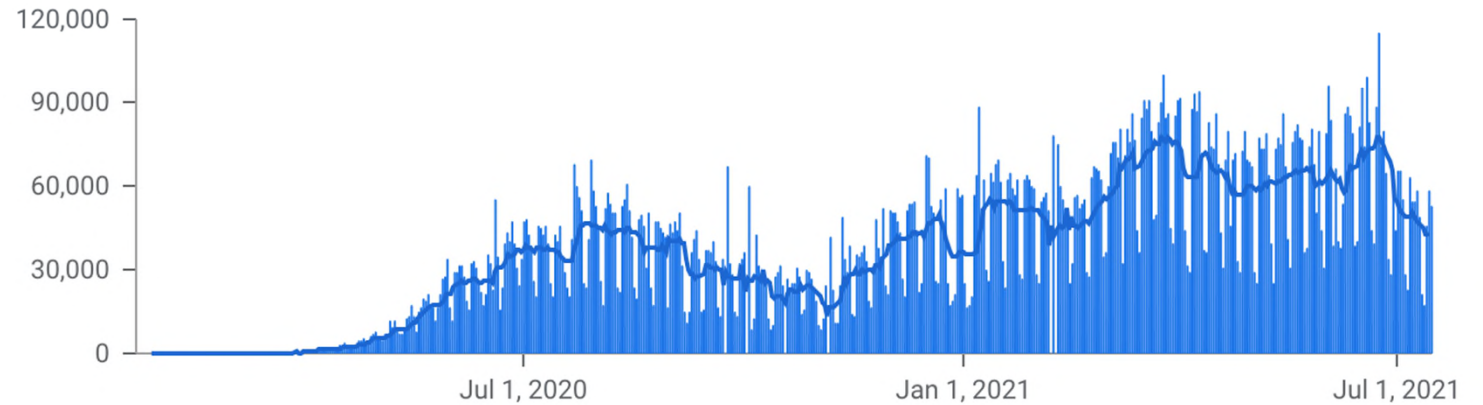- Postodoctoral Researcher, Irish Centre for Cloud Computing & Commerce

# Brazil continues to experience a high volume of COVID-19 case



## Cases

Brazil

Cases: New | Total

Each day shows new cases reported since the previous day

# Brazil continues to experience a high volume of COVID-19 case

### Brazil

| Total cases | New cases (14 days) | Deaths |
|---|---|---|
| **19,262,518** | | **538,942** |
| Reported yesterday: **+52,789** | Jul 2–15: **+640,214** | Reported yesterday: **+1,548** |

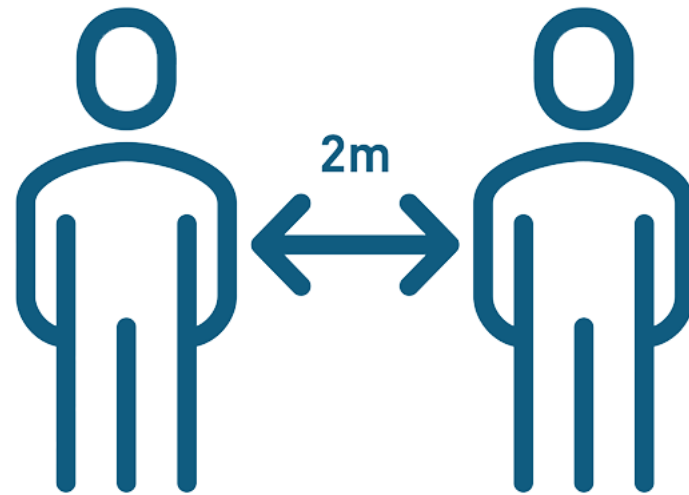| Total doses given | New doses given (14 days) | People fully vaccinated |
|---|---|---|
| **120,873,006** | | **33,296,719** |
| Reported yesterday: **+1,986,396** | Jul 2–15: **+18,092,910** | % of population: **15.8%** |

In 2020, due to the absence of pharmaceutical interventions, the Brazilian governments implemented lockdowns, social distancing and contact tracing interventions.
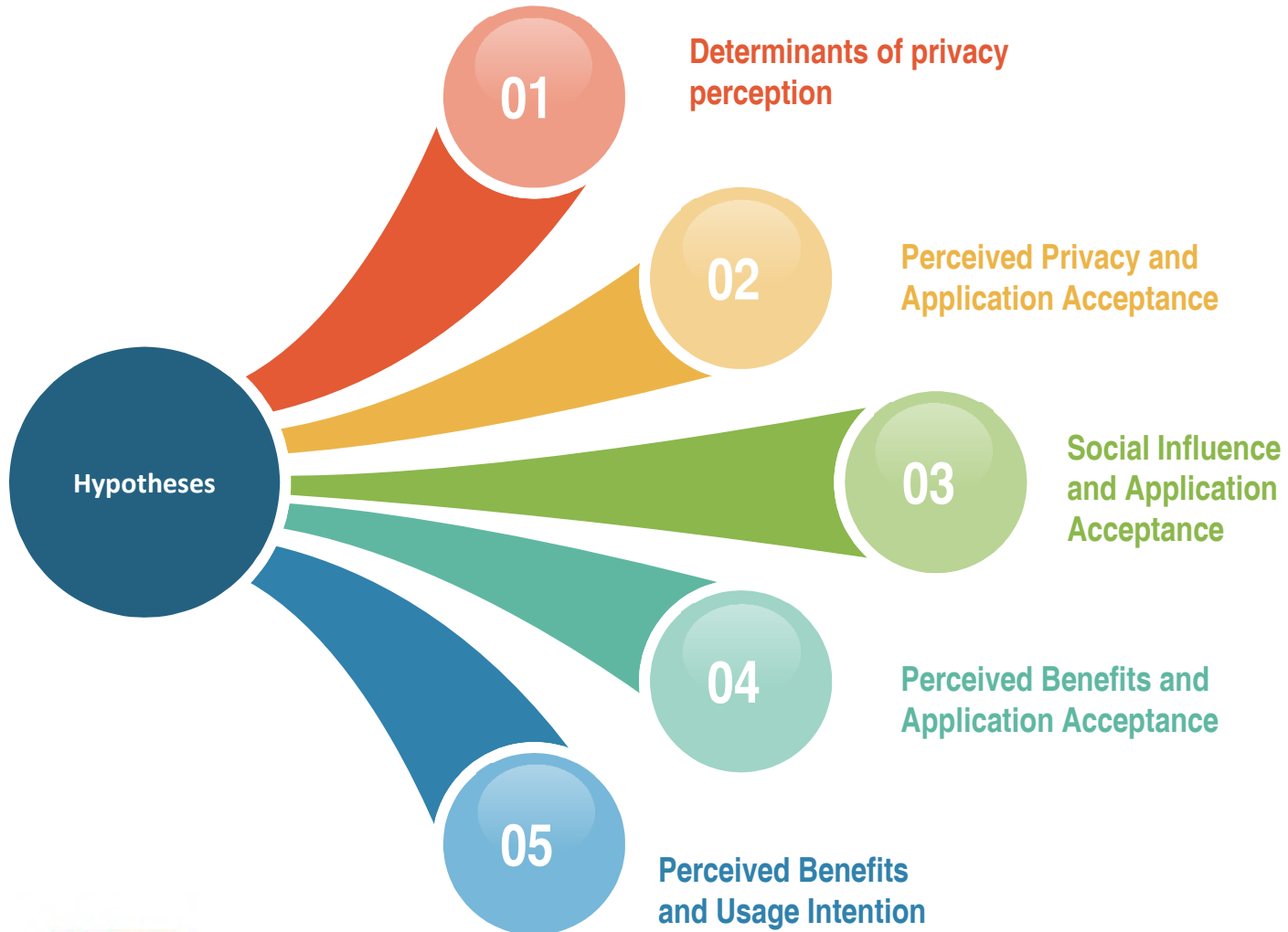
**A number of contact tracing apps and monitoring apps were introduced in Brazil during the pandemic however required disclosure of location and electronic personal health information (ePHI).**
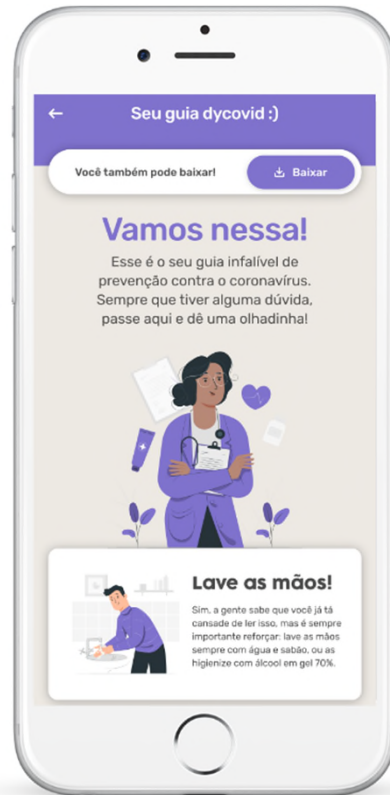
What roles do individual's perceptions of privacy and benefits play in determining their acceptance and use of contact tracing applications?

# Five hypotheses based on social contact theory and privacy calculus theory were developed

**01** Determinants of privacy perception

**02** Perceived Privacy and Application Acceptance

**03** Social Influence and Application Acceptance

**04** Perceived Benefits and Application Acceptance

**05** Perceived Benefits and Usage Intention

Hypotheses

- *H1a: Perceived Surveillance in the App is negatively associated with Perceived Privacy*
- *H1b: Propensity to trust technology is positively associated with Perceived Privacy*
- *H1c: Perceived Control in App is positively associated with Perceived Privacy*

- *H2a: Perceived Privacy is positively associated with usage intentions.*
- *H2b: Perceived Privacy is positively associated with willingness to disclose personal data.*

- *H3: Social influence is positively associated with usage intentions.*

- *H4a: Reciprocal benefits is positively associated with usage intentions.*
- *H4b: Reciprocal benefits is positively associated with willingness to disclose personal data.*
- *H4c: Reciprocal benefits is positively associated with willingness to rely on the app.*

- *H5: Perceived health benefits is positively associated with usage intentions.*

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# Proposed model for users and non-users
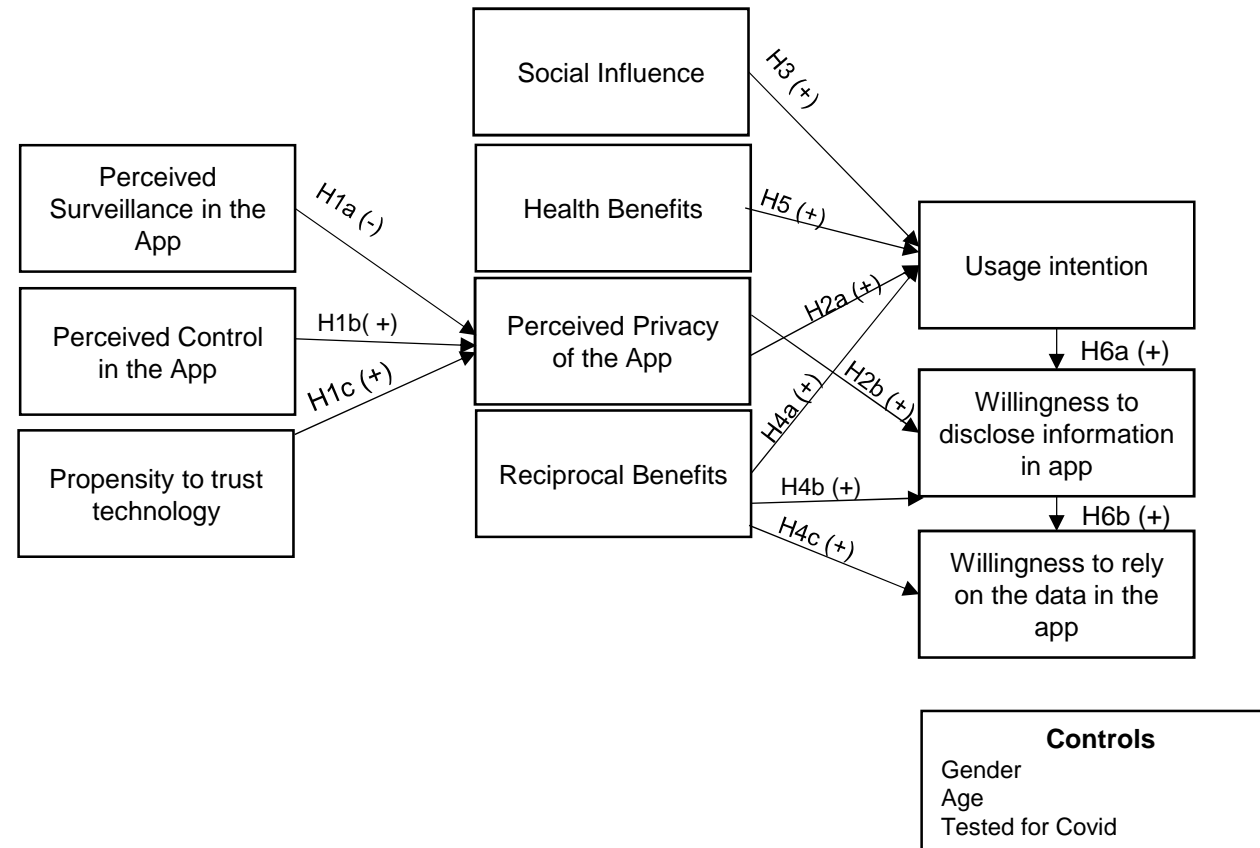
# Methodology and Analysis

- Existing scales were used to develop our survey instrument

- Survey was piloted and translated in to **Brazilian Portuguese**

- Respondents were asked about **prior use of COVID-19 apps to identify users and non-users** – specific or neutrally framed questions were then posed.

- **Qualtrics panels** were used to source a nationally representative panel of residents in Brazil

- **No identifying data** was collected to reduce fears around anonymity and common method bias.

- An **attention trap** was included.

- Model tested using Structured Equation Modelling (SEM) in AMOS v25

| Construct | Items | Source |
|---|---|---|
| 1. Intention to Adopt/Continue Use | 3 | Venkatesh et al. (2003)/ Bhattacherjee (2001) |
| 2. Willingness to Disclose Accurate Data | 2 | Xu et al. (2009) |
| 3. Willingness to Rely on App | 3 | McKnight et al. (2002) |
| 4. Reciprocal Benefits | 2 | Hamari & Koivisto, (2015) |
| 5. Perceived Health benefits | 5 | Li et al. (2014) |
| 6. Social Influence | 4 | Venkatesh et al. (2003) |
| 7. Perceived Control | 4 | Dinev et al. (2013) |
| 8. Perceived Privacy | 3 | Dinev et al. (2013) |
| 9. Perceived Surveillance | 3 | Xu et al. (2012b) |
| 10. Propensity to trust technology | 4 | McKnight et al. (2011) |

# Sampling and Screening
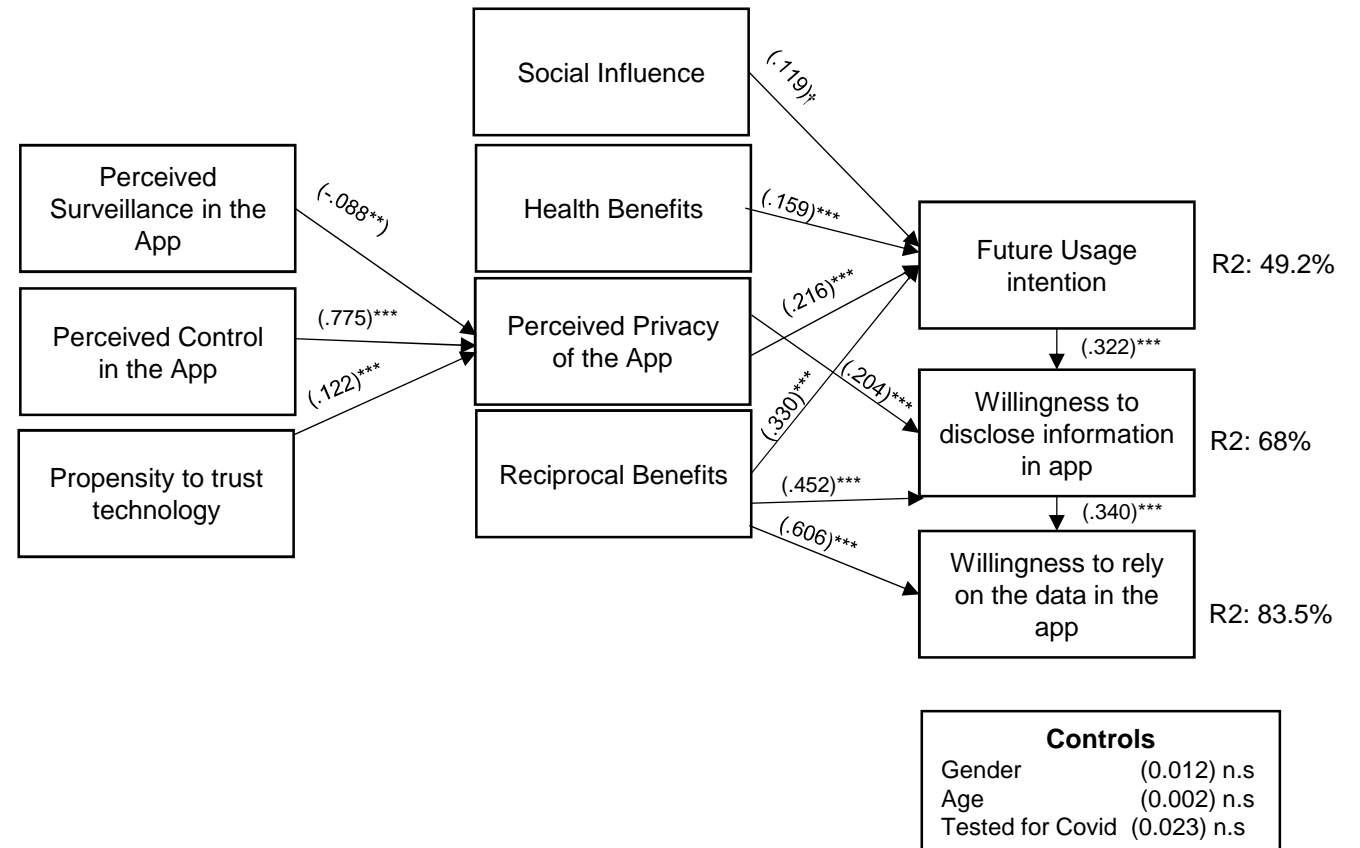## Final sample of 1,114 responses

| Gender | | Age | | Employment | | Education | |
|---|---|---|---|---|---|---|---|
| Male | 524 | 18-20 | 79 | Employed | 507 | Primary School | 9 |
| Female | 589 | 21-29 | 252 | Self-employed | 272 | High School | 467 |
| Rather Not Say | 1 | 30-39 | 286 | Unemployed | 149 | Technical College | 14 |
| Other | 0 | 40-49 | 214 | Student | 86 | Bachelor degree | 382 |
| | | 50-59 | 175 | Unavailable for work | 11 | Masters degree | 294 |
| | | 60-69 | 96 | Retired | 89 | Doctorate degree | 35 |
| | | 70+ | 12 | | | Other | 13 |

**Personal Experience with Covid 19:**

| Tested for Covid-19 | | Diagnosed with Covid-10 | | Hospitalized | |
|---|---|---|---|---|---|
| Yes | 211 | Yes | 48 | Yes | 3 |
| No | 893 | No | 1062 | No | 45 |
| Rather not say | 10 | Rather not say | 4 | N/A | 1066 |

# Results for App Users

| | |
|---|---|
| H1a: Perceived Surveillance in the Aps >> Perceived Privacy | Yes |
| H1b: Propensity to trust technology >> Perceived Privacy | Yes |
| H1c: Perceived Control in App >> Perceived Privacy | Yes |
| H2a: Perceived Privacy >> Intention to continue use | Yes |
| H2b: Perceived Privacy >> Willingness to Disclose Data | Yes |
| H3: Social Influence >> Intention to continue use | No |
| H4a: Reciprocal Benefits >> Intention to continue use | Yes |
| H4b: Reciprocal Benefits >> Willingness to Disclose Data | Yes |
| H4c: Reciprocal Benefits >> Willingness to Rely on App | Yes |
| H5: Health Benefits >> Intention to continue use | Yes |
| H6a: Intention to continue use >> Willingness to Disclose Data | Yes |
| H6b: Willingness to Disclose Data >> Willingness to Rely on App | Yes |



Social Influence

Perceived Surveillance in the App  (-.088**)

Health Benefits  (.159)***

Perceived Control in the App  (.775)***

Perceived Privacy of the App  (.216)***

Propensity to trust technology  (.122)***

Reciprocal Benefits

(.119)†

Future Usage intention  R2: 49.2%

(.322)***

(.330)***  (.204)***

Willingness to disclose information in app  R2: 68%

(.452)***

(.606)***

(.340)***

Willingness to rely on the data in the app  R2: 83.5%

**Controls**
Gender          (0.012) n.s
Age              (0.002) n.s
Tested for Covid  (0.023) n.s

# Results for Non-Users

| | |
|---|---|
| H1a: Perceived Surveillance in the Aps >> Perceived Privacy | Yes |
| H1b: Propensity to trust technology >> Perceived Privacy | Yes |
| H1c: Perceived Control in App >> Perceived Privacy | Yes |
| H2a: Perceived Privacy >> Intention to download the App | Yes |
| H2b: Perceived Privacy >> Willingness to Disclose Data | Yes |
| H3: Social Influence >> Intention to download the App | No |
| H4a: Reciprocal Benefits >> Intention to download the App | Yes |
| H4b: Reciprocal Benefits >> Willingness to Disclose Data | Yes |
| H4c: Reciprocal Benefits >> Willingness to Rely on the App | Yes |
| H5: Health Benefits >> Intention to continue use | Yes |
| H6a: Intention to continue use >> Willingness to Disclose Data | Yes |
| H6b: Willingness to Disclose Data >> Willingness to Rely on the App | Yes |
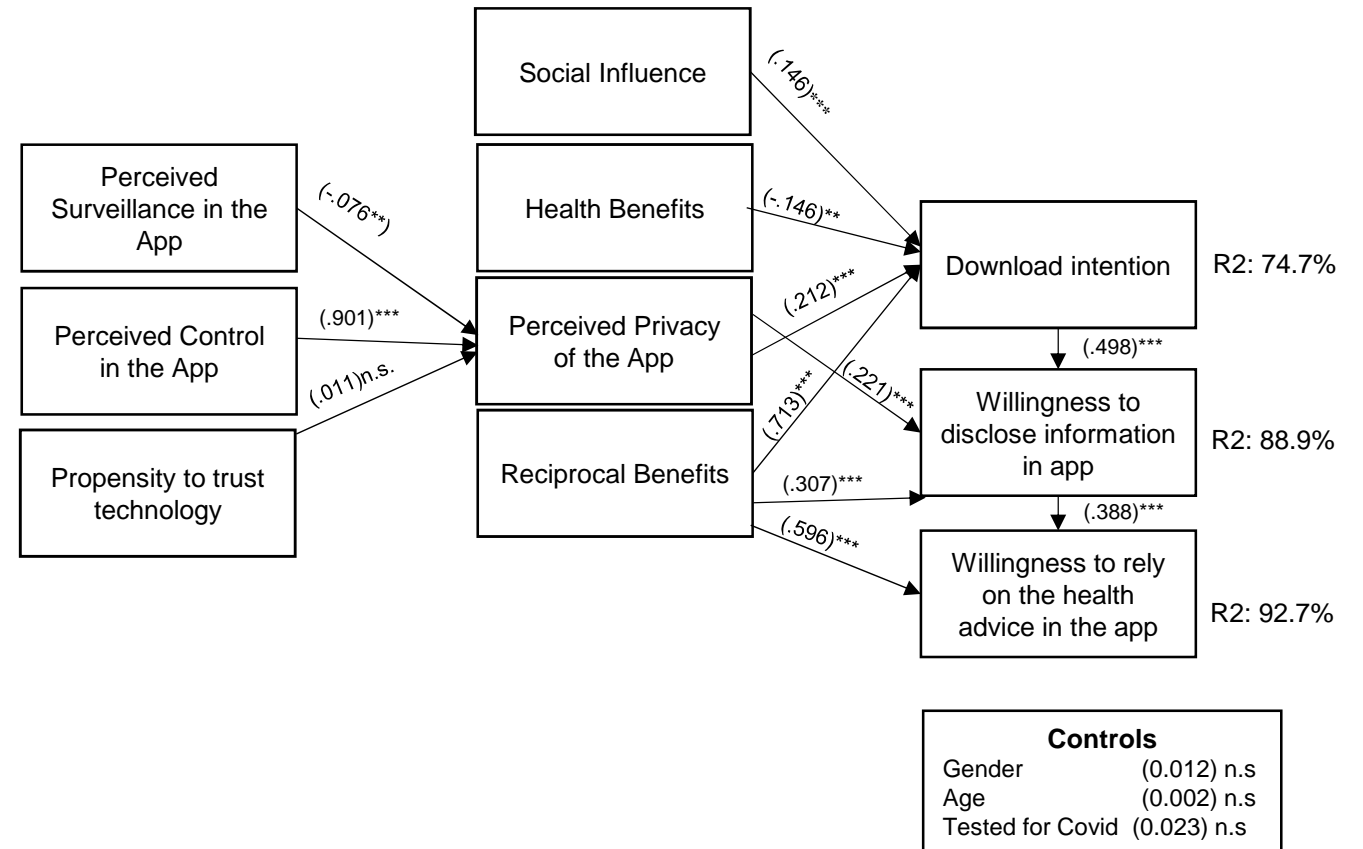
# Discussion

- Support previous assertions of importance of offering some level of control to foster belief in a social contract (Culnan & Armstrong, 1999)

- Highlight negative role perception of surveillance can play particularly if perceived as excessive

- The study of users and non-users is important to avoid the risk of accepting a worldview in which adoption of new technology is the norm

- Social influence is more important when deciding to adopt (for non-users) than continued use (existing users)

- Decisions to adopt and continue to use are highly influenced by the various acceptance variables

# Obrigada!

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