

Understanding citizens' motivations to use contact-tracing apps

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Abstract

During the COVID-19 pandemic, numerous countries have launched contact-tracing apps to help preventing the spread of the coronavirus by tracking their citizens' contacts with other individuals. As the effectiveness of these apps depends on a large percentage of the population downloading and using them, understanding the factors that influence contact-tracing apps' adoption has become a crucial task for governments. While most previous studies have focused on information technology and political factors as determinants of apps' usage, this work is aimed at providing a different perspective by focusing on citizens' altruistic and egoistic motivations to use contact-tracing apps during the pandemic.

Keywords: app, contact-tracing, coronavirus, COVID-19, motivation

1. Introduction

The coronavirus (COVID-19) pandemic has become one of the world's major health crises of the last century. In an attempt to curb coronavirus outbreaks due to contact with asymptomatic patients, governments around the globe have been forced to establish limitations on citizen mobility as well as to implement traditional contact-tracing programs (Trang et al., 2020). Traditional contact-tracing is a technique that has been used for decades; it's operation consists of specialized health personnel (called 'trackers') holding individual interviews with those infected by the virus to note the contacts they had with other individuals in the previous days and, subsequently, locating those individuals to ask them to remain in quarantine at their homes.

However, due to the high risk of contagion and the rapid transmission of the COVID-19, controlling the current pandemic by traditional contact-tracing is not feasible (Ferretti et al., 2020). One solution to this problem that has caused great controversy is the implementation of contact-tracing apps (Trang et al., 2020). These apps use big data and Bluetooth and GPS technologies to automatically register all app users to whom an individual has been in contact for a certain amount of time (usually more than 15 minutes), in a small distance (less than 2 meters approximately), in the last few days (from one to two weeks depending on the app). When a user is infected by the virus and notifies it to the app, the rest of the people who have been in contact receive a warning message on their mobile phones to stay in quarantine, thus preventing the spread of the virus.

Although contact-tracing apps offer a possible solution to bend the contagion curve, their effectiveness depends on a large percentage of the population downloading and using the app. This is why countries such as China have made their use mandatory (Farronato et al., 2020). However, in European countries their use is entirely voluntary. Therefore, it is of critical importance to understand the factors that influence contact-tracing apps' adoption among citizens.

Numerous studies in the last year have focused on analysing the effect of information technology aspects, such as privacy and cyber security risks (Altmann et al., 2020), lack of technical equipment (Horstmann et al., 2021), individuals' technical abilities (Albrecht et al., 2021), app specifications (Trang et al., 2020), data storage (Buder et al., 2020), etc., and political factors, such as individuals' political views (Wnuk et al., 2020) and trust in the government (Altmann et al., 2020), on the adoption of contact-tracing apps. Although these factors are worth studying, the successful adoption and usage of contact-tracing

apps is not only explained by information technology and political factors, but also strongly relies on individual motives. Motivational factors have successfully been used to explain why users engage in voluntary behaviours towards information systems and online communities (Kim et al., 2018), but scant research has been done in the context of contact-tracing apps. Therefore, this study draws on the theory on altruistic and egoistic motivation for prosocial behaviours (Batson and Shaw, 1991) to analyse the underlying motives for using contact-tracing apps.

2. Theoretical framework and research questions

Citizenship behaviours (or prosocial behaviours) can be defined as behaviours that benefit any community and its members, but go beyond requirements and are not directly or formally rewarded (Lemmon and Wayne, 2015). In relation to contact-tracing apps, these behaviours refer mainly to downloading and using the app (e.g., sharing location information, informing if getting infected, etc.) to create a base of users so the app is effective, and also to other behaviours such as advocacy and helping. Advocacy refers to recommending the app to other potential users, such as work colleagues, family and friends, whereas helping refers to users' behaviour aimed at assisting other users downloading and using the app (Yi and Gong, 2013). So, a question arises: what motivates citizens to perform these behaviours?

Batson and Shaw (1991) proposed two types of motivation depending on the ultimate goal that drives the action: altruistic motivation and egoistic motivation.

On the one hand, altruistic motivation "*is a motivational state with the ultimate goal of increasing another's welfare*" (Batson and Shaw, 1991, p. 108). Altruism involves benefiting others without expecting something in return, and has been largely found to positively influence the intention to share knowledge, accommodation, etc. with others as a way of helping them (Kim et al., 2018; Lee et al., 2015; Naranjo-Zolotov et al., 2019). During the pandemic, some citizens might become users of a contact-tracing app to contribute to their communities' fight against the virus without expecting anything in return for their help.

On the other hand, egoistic motivation is "*a motivational state with the ultimate goal of increasing one's own welfare*" (Batson and Shaw, 1991, p. 108). Egoistic forms of motivation include reciprocity, which involves making contributions for a common goal, based on a perception of supportiveness among the members of a community (Naranjo-Zolotov et al., 2019). Contact-tracing apps' effectiveness depends on a large amount of citizens being users; so, although using the app could involve some cost (e.g., battery consuming, concerns about lack of privacy when sharing location information, etc.), citizens might become users with the thought that, if everyone does the same, at the end everyone will benefit from each other. Apart from reciprocity, citizens might also engage with contact-tracing apps due to felt obligation; this is, the inner obligation to care about one's community or organisation's welfare, not to relieve other's suffering, but to receive self-benefits, such as avoiding guilt due to a lack of fulfilment of one's perceived duties (Gebauer et al., 2008). Finally, the ultimate goal of certain citizens to become users of contact-tracing apps might be their own good and benefit, which is inner to human nature, such as receiving valued information about infections, etc.

3. Methodology

A study has been developed in the context of Ireland's contact-tracing app, called Covid Tracker Ireland. Downloads of the Covid Tracker Ireland app reached the equivalent of a

third of smartphone users in the country in just its second week (BBC News, 2020). Thus, it is worthwhile to analyse.

Data collection took place during the first term of the academic course 2021-2022, coinciding with Ireland's plans for a safe return to University campuses. Following approval from the University's research ethics committee, an online survey was circulated to users of the Covid Tracker Ireland app, among students and staff of one of the largest Universities in Ireland.

To measure all the constructs included in the online survey, well-established scales taken from previous literature have been adapted to ensure that the items fit the context. 7-point Likert-type scale items are used, ranging from 1 (strongly disagree) to 7 (strongly agree). Regarding altruistic motivations, altruism has been adapted from Reimer and Benkenstein (2016) whereas supporting the health system has been measured adapting items from Choi and Lotz (2016). With regards egoistic motivations, reciprocity has been measured using items from Wasko and Faraj (2005) and Hsu and Lin (2008), felt obligation has been measured according to Eisenberg et al. (2001), and individuals own good has been adapted from Reimer and Benkenstein (2016). Finally, regarding behaviours towards the app, continuance use intention has been adapted from Venkatesh et al. (2012), whereas advocacy and helping behaviours have been adapted from Yi and Gong (2013).

The final sample consists of 221 individuals, with a mean age of 33 years old. 67,9% of respondents are women, 82,9% have tertiary education, and 90,5% are from Ireland.

4. Results

First, the different types of motivation were analysed. The results show that the strongest motivation to use Covid Tracker refers to altruism (*Mean*= 5,44; *SD*= 1,63) followed by supporting the HSE (*Mean*= 5,10; *SD*= 1,63), which are both forms of altruistic motivation. On the other hand, although egoistic motivation is also a strong determinant of individuals' use of Covid Tracker, these types of motivation are less important than the previous ones. In particular, using the app for one's own good is the strongest egoistic motivation (*Mean*= 4,75; *SD*= 1,46) followed by a sense of felt obligation (*Mean*= 4,66; *SD*= 1,55). Finally, reciprocity (*Mean*= 4,63; *SD*= 1,72) is the least important motivator for using Covid Tracker.

Then, prosocial behaviours towards Covid Tracker were analysed. The results show that helping others to install and use the app has not been very common among respondents (*Mean*= 3,82; *SD*= 2,08). On the contrary, respondents have recommended the use of the app to other individuals (*Mean*= 4,65; *SD*= 1,87) and those who are still using it show high intention to continue using it (*Mean*= 5,58; *SD*= 1,52).

Differences in motivations and prosocial behaviours have been analysed based on age and gender. Results suggest that, overall, motivation to use Covid Tracker increases with age. Both the intention to continue using the app and recommending the app to others increases with age too. This could be due to the fact that older people feel more vulnerable to the Covid-19 and, therefore, are more prone for contact tracing than younger people. However, the youngest cohort (18-25) are the ones showing greater helping behaviours. This could be due to the fact that younger generations are more used to technology and, thus, they are the ones explaining to their parents, grandparents, etc. how to install and use Covid Tracker. Regarding gender, women show higher levels of all types of motivation to use Covid Tracker and greater intention to continue using the app and

recommend Covid Tracker to others. On the contrary, males have helped others in using the app more than females.

Finally, differences in respondents' motivations to use Covid Tracker have also been analysed based on health-related aspects. It has been found that, respondents who have not got Covid-19 are more motivated to use Covid Tracker than those who got infected and are also more prone to continue using the app and recommend the app to others. This could be due to the fact that those individuals who got infected have developed more antibodies and, thus, are less worry about getting infected again. However, individuals who had Covid-19 have shown greater helping behaviours in using Covid Tracker. Besides one's own health, differences in motivation to use Covid Tracker were analysed based on the health condition of respondents' household members. In this case, it has been found that those individuals with family members with a health condition are more motivated to use Covid Tracker, both for altruistic and egoistic reasons, and show greater intention to continue using the app as well as greater recommendation and helping behaviours that those who do not have household members with health conditions. The main reason for this could be that they are more interested in containing the virus as it could affect their family members more than the average citizen.

5. Contributions

This study has analysed the motivations for using the Ireland's contact-tracing app 'Covid Tracker' and investigated the prosocial behaviours performed by these individuals.

The results have shown that the use of the app is explained to a greater extent by altruistic motivations. Egoistic motivations, such as the use of the app for one's own good, the sense of felt obligation and reciprocity, are less important, although they present values above the average. Women, those over 46 years of age, individuals who have not suffered the Covid-19 and those who have household members with health conditions show higher scores for all the types of motivations analysed.

Regarding prosocial behaviors, the results show that although respondents have recommended the use of the app to other individuals, they have not been very inclined to help others to install and use the app. In this case, men and young people have helped the most, while older people and women have recommended it the most.

Finally, the intention to continue using the app is high, with women, those over 46 years of age, individuals who have not got infected by Covid-19 and who have household members with health conditions, those who present higher average values.

This study provides the following contributions to the literature on contact-tracing apps.

First, while previous studies have mostly explained contact-tracing apps' adoption and use based on information technology aspects (e.g., Albrecht et al., 2021; Altmann et al., 2020; Buder et al., 2020; Horstmann et al., 2021; Trang et al., 2020) and political factors (e.g., Altmann et al., 2020; Wnuk et al., 2020), this study provides a different perspective by focusing on individuals' motives, distinguishing between altruistic and egoistic types of motivation. Additionally, besides adoption and use, this study focuses on two voluntary behaviours that are also crucial for the success of contact-tracing apps among the population, which are advocacy and helping behaviours.

Secondly, most previous studies analysing citizens' use of contact-tracing apps have been focused on a limited set of countries; in particular, most empirical research has been carried out in Germany, UK, US, France and China. This study broadens this scope by

analysing Ireland's Covid Tracker app, which has been one of the most successful apps due to its adoption. Thus, it is worth studying what makes this app uniquely interesting.

Third, most empirical studies analysing the phenomenon of contact-tracing apps were performed during the first six months after the launch of the first contact-tracing app worldwide (i.e., March to August 2020). During these first months, citizens were not aware about the exact functioning of these apps, which generated a big debate about their use. This could have affected the results of the first studies. Indeed, most countries at that time had not even launched their own contact-tracing app. This study analyses the phenomenon of contact-tracing apps' adoption with more than one year and a half of pandemic, and also at the moment that most population has been vaccinated and contact-tracing apps are used to include the Digital COVID-19 Certificate (proof of vaccination).

Finally, as during those first months in which most studies were carried out most countries had not even launched their contact-tracing apps, most studies did not survey real users of contact-tracing apps. On the contrary, most research focused on hypothetical situations with hypothetical apps, alternative designs for an app, as well as general public's opinions about contact-tracing apps. This study bridges this gap too by using a sample of real users of a real in-use contact-tracing app.

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