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Investigating Italian citizens' attitudes towards Immuni, the Italian contact tracing app

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Abstract. This research investigates Italian citizens' attitudes towards the contact tracing app Immuni, promoted by the Italian government to track the spread of Covid19 and prevent possible future out-breaks. More specifically, this paper tries to uncover the factors that have motivated individuals to uptake the app or fail to do so. We have used a variety of qualitative methods: firstly, a virtual ethnography has been conducted, analyzing thematically 3013 tweets with the hashtag #Immuni. To further investigate the motivation behind either the adoption or the refusal of Immuni, twenty semi-structured interviews have been carried out with potential and actual users. A doctor and a health official have been also interviewed as secondary users. The results show that multiple factors shape users' attitudes towards Immuni and influence their willingness to adopt it. The most relevant have to do with the perceived benefits, perceived barriers, perceived efficacy of the app and the cues to action. The usability of the overall app is also discussed with a focus on some of the key issues identified by the users.

Keywords: User research · contact tracing apps · qualitative research methods

1 Introduction

In June 2020, the Italian government announced the launch of Immuni, a contact tracing app (hereafter, CTA) designed to help preventing Covid19's diffusion by tracking citizens' social exchanges and notifying them of potentially infected contacts [6]. By August 2020, only 5 million users had downloaded Immuni, 13 percent of the target population (all of people living in Italy above 14 years old) [1]. A marketing campaign - "Scarica Immuni Week" (Let's download Immuni) - was consequently launched (October 5-12, 2020). The campaign notwithstanding, in early February 2021, only 10 million Italians had downloaded the app. The effectiveness of CTAs is contingent upon their popularity. Previous studies have found that the spread of the virus could be controlled digitally if 56 percent of the overall population (80 percent of smartphone users) adopted the app [8]. Ferretti and colleagues [7] have argued that if 60 percent of the population adopted a CTA, a significant portion of asymptomatic contagions could be prevented. Why then has Immuni failed to gain adequate acceptance? This

paper - through the combined use of a virtual ethnography conducted on Twitter, and semi-structured interviews with primary and secondary users - explores user motivations driving the acceptance- or the rejection - of Immuni.

2 Related Work

Being able to accurately and rapidly trace contacts is proven to be a key strategy in slowing down the spread of a virus. By identifying those in contact with an infected individual early enough, it becomes possible to quarantine them before they continue to spread the virus without overloading the national health system [5]. Digital contact tracing used together with manual tracing can fasten the process of tracing contacts and contribute to contain the spread of the virus. In addition, digital contact tracing presents some striking advantages compared to the alternative. In fact, while manual tracing requires specialized personnel and resources, on top of being extremely time consuming [9], digital contact, if well-implemented, can be cheaper and faster. Furthermore, it allows widening the range of people informed, indeed the contagion does not only occur among people who know each other but it might take place among strangers. Thus, with the employment of digital contact tracing, it becomes possible to reach and inform all those potential contacts that were nearly impossible to achieve by relying merely on memory.

Yet, the success or the failure of this system highly depends on how many people decide to uptake it. Since most European countries have opted for introducing the contact tracing system on a voluntary basis, it becomes extremely important to explore and understand what motivates people to either download or not download a contact tracing app.

There is, however, very little research carried out on users' attitudes towards CTAs. To our knowledge, the only study which tackles this issue qualitatively has been conducted in UK by Williams et al. [10]. The researchers run multiple focus groups to explore British citizens' attitudes towards the contact tracing app designed and developed by the National Health System (NHS). Several relevant themes emerged in their research, mainly participants expressed a lack of knowledge and appropriate information regarding contact tracing apps. In addition, they worried about their privacy and the use of their sensitive data and they showed concerns over the app's uptake arguing that the percentage of uptakes of the app was a crucial factor in its success, thus if not enough people downloaded the app, then it would have not been fully effective.

However, this study was conducted before an official app was released. The fact that the app did not exist but was only a proposal by the time the investigation was undertaken, makes it more difficult for the participants to have a clear idea of the actual app and its actual functioning. This research aimed to expand on this previous study by attempting to overcome this limitation. In fact, this study investigated users' attitudes towards Immuni, which was released and available for download prior the beginning of the data collection. Therefore, the participants had a clear idea of the contact tracing app as well as had the choice

to either download it or not. This made possible to expand the research from behavioral intentions to actual behavior.

Furthermore, this research not only seeks to investigate users' motivation for up-taking contact tracing app, but also aims to expand on previous studies by adding the analysis of secondary users of the contact tracing app. Indeed, in this scenario, the users are not only those citizens who make use of Immuni, but also the contact-tracing operators who deal with the Immuni's health-related procedure and make the overall system function. They can be defined as secondary users, as they interact with primary users and interact with the system and they rely on primary users to obtain information to make the system function, following the definition provided by Alsos [2], and their contribution and insights on the procedure behind Immuni might be a key factor in the evaluation of the app itself and determining its success.

3 Immuni

Immuni is based on two different mechanisms: the generation of a random key of exposure and Bluetooth low energy (BLE). Once Immuni is installed on a device (Device1), it generates an exposure key that is temporary, random and changed daily. By using BLE, the phone transmits a signal that is generated by the random exposure key and which contains a rolling proximity identifier (ID of Device1). When another device with Immuni (Device2) receives this signal, both devices save the rolling proximity identifier locally, in their memory. If the user of Device 1 tests positive for Covid19, s/he can upload, with the external help of an operator, a random exposure key into Immuni's server, which derives the rolling proximity identifiers broadcasted recently by Device 1. At this point, Device 2, which periodically compares all the random keys shared in the server with locally saved rolling proximity identifiers, will find a match with Device 1 and it will – if the length of the contact and the distance between the devices is above certain thresholds - inform the user of potential exposure to the virus. Once risky exposure has been detected, Immuni advises the user to consult a general practitioner. It is the GP that may prescribe a precautionary quarantine or a nasal swab. If the test for Covid-19 is positive, the operators of the National Health Service can, with the user consent, insert the user's random temporary exposure key on Immuni's server, thus informing the other users potentially exposed.

4 Methods

4.1 Data collection

The data were collected using three different methodologies:

- a virtual ethnography on tweets gathered from the launch of the app on 15th of June until the 12th of October, the end of the "*Scarica Immuni Week*",

- twenty interviews with primary users run from 21st of October until the 27th of October
- two interviews with secondary users undertaken on the 5th of November

The virtual ethnography data were gathered from June 15 (the launch of the app) to October 12 (the conclusion of the Scarica Immuni Week). The relevant tweets were scraped from Twitter using the website [.vicinitas.io](http://vicinitas.io)

All the tweets, posted within two days, having the #immuni specific hashtag were collected. The data set (N=30,532) was subsequently cleaned, deleting all tweets not in Italian, duplicates, replies or retweets (around 25,500 of the tweets gathered). All surviving tweets were read to check their pertinence. The final data set consisted of 3,013 tweets. The authors followed Braun and Clarke's guidelines [4].

A thematic analysis of the tweets revealed several themes: (a) perceived benefits, (b) perceived barriers, (c) perceived efficacy, (d) cues to action, and (e) overall usability. These themes were used as a model for the 22 semi-structured interviews with primary users, collected between October 21–27, 2020. Along with socio-demographics, participants were asked questions about the perceived benefit (What, do you think, has encouraged people to download Immuni?), the perceived barriers (What do you think has encouraged people not to download Immuni?), the perceived efficacy (Would you say that Immuni has an active role in the fight against Covid19?), cues to action (How did you hear about Immuni?), and overall usability (Have you ever encountered problem using Immuni?). Participants were recruited by using two methods. Ten were recruited by posting the following notice on Instagram and Facebook: (Do you want to participate in a very cool initiative?), while ten were recruited by randomly searching for last names on the website www.paginebianche.it, the Italian national phone-book posted online. Simultaneously, the authors decided to interview two secondary users. On November 5, a physician and an employee of an ASL (the local unit of the national health service), both involved with Immuni, were interviewed concerning two main issues: a) How do you think Immuni fits within the contact tracing procedure? b) What do you think of Immuni and its efficacy?

The interviewed sample consisted of 11 men and 11 women. Almost half of the sample (N=9) was in the 20-30 age cohort, while the remainder was evenly distributed. Among those 11 were Immuni users and 9 stated they did not download the app at the time of the interview. User evaluation of Immuni was defined as all factors (perceived benefits, perceived barriers and perceived efficacy) that have an impact on the overall evaluation of the Immuni as an effective CTA. Cues to action were defined as all the cues able to trigger the download of Immuni. Usability was employed as a general term covering all the usability aspects of the tool.

All material gathered in this study was in Italian, yet it was translated to be presented in English in this paper. This generates a series of implications concerning the validity of the report and the research itself as it is almost impossible to achieve a perfectly matching translation as many words and idiomatic expressions in Italian might not be fully translatable in English. In this regard, trans-

lation has been done by the researcher, who is fully proficient in both English and Italian, with the goal of achieving semantic and conceptual equivalence [3].

4.2 Data analysis

Both datasets, consisting of tweets and interviews, were studied through inductive thematic analysis: a strict semantic logic, which exclusively paid attention to the meaning of words, was employed. All data were read to gain familiarity with the corpus and obtain a general understanding of it (phase 1). Subsequently, a systematic study of the textual corpus made identification of repeating patterns and the generation of codes possible. Themes and sub-themes emerged (phase 2). One of the researchers analyzed the data, while the second checked the results independently.

To guarantee the anonymity of the tweets' authors, all the collected data were anonymized. Interviewees were asked beforehand to give their informed consent and willingness to be recorded. They were informed that all data collected during the interview phase would be subsequently anonymized.

5 Results

5.1 Users' overall evaluation of the app

The user's evaluation is contingent upon three sub-themes: the perceived benefits arising from using the app, the perceived barriers encountered by the users when presented with Immuni, and the perceived efficacy of Immuni as a protective health measure. Concerning the benefits, the first sub-theme, the study documents how the benefits of Immuni are identified by the users mainly with tracing contacts effectively and contribution to prevent the spread of the virus. However, users show a variety of concerns regarding the use of Immuni, and these concerns acted as potential barriers that could prevent them from using it. The most significant one was the users' suspect that Immuni could impose automatically a quarantine to all of those notified by the system, even when healthy. *.. and above all, the fear of being in quarantine, without a real need to do so.* (Giovanni)¹. The alleged quarantine imposed by Immuni was different from the one prescribed by their GP: it was not perceived as mandatory or as reliable as the one prescribed by a doctor, thus it could be easily avoided or dismissed by the users. *And the fact that an app is the one which informs you that you have to be in quarantine, and it is not your doctor, or a person whom you trust, or anybody else, it what convinces people not to download it* (Lops)².

Some users perceived this (alleged) imposition and the fact that Immuni could trace contacts with other users as a violation of their individual freedom and a violation of their privacy. This belief might have encouraged some not to trust the app and therefore, it might have led not to download it. *#Immuni*

¹ interview(24/10/2020)

² interview(26/10/2020)

*intrudes your privacy, it records your data and limits you freedom. Do not download it, for your own good and for those around you (Fla)*³.

On the contrary, some participants showed no privacy fears or concerns claiming that they considered Immuni as a safe app and that they believed the data collected by Immuni to be safely protected. *I mean, even if I have it on my phone, Immuni is an app that does not collect any information about me and I know that the data collected on Immuni are used only for epidemiological purpose.* (Sara)⁴

Another important aspect concerning the barriers encountered was the digital divide among users. This was mainly related to age and economic status. From the data analysis, it was highlighted how elderly, who are not used to digital devices, might encounter some difficulties in both downloading Immuni and using it correctly. In addition to that, Immuni, as it was described in the introduction, requires a newer software to function correctly. Thus, all of those citizens with older phones, who cannot afford a new phone to have Immuni, are not be able to download and use the app. Therefore, both elderly and people coming from a lower socio-economic status might be systematically excluded from this health-related public service. Often, the two factors (user's older age and phone's incompatibility) are combined together for the elderly, who have difficulties in using digital devices and smartphones, but also own older phones which might not be compatible with Immuni. *Here you have some very very old phones. For instance, my mum and dad, who are around 80s, don't have smartphones, what will they do then? You can sit down and teach them how to use it but it is too complicated. Thus, Immuni has zero efficacy with such an old population and these very old phones.* (Salvatrice)⁵.

Concerning the last sub-theme: the evaluation of the efficacy of Immuni, it has emerged that Immuni was perceived as ineffective because of its low rate of adoption. According to many, such a failure had occurred because its adoption was completely voluntary, encouraging many citizens not to download it. *Immuni was not imposed, thus it was not downloaded.* (Moody)⁶. It seems that many citizens would have preferred a more coercive method, wherein the government imposed Immuni to access some services and some public places *They (the government) should have forced us to download it. We all should have been forced, also those who cannot do it by themselves, like me for example. They would have had to set up a public spot or office in which you can go and they help you out downloading it* (Salvatrice)⁷.

Finally, concerning the evaluation of Immuni as an effective tracing system, the integration with the national health system (SSN) was discussed. According to the data analyzed, users believed that Immuni was not properly integrated into the actual operations of the national health system. *Also because I know that*

³ tweet(10/10/2020)

⁴ interview(23/10/2020)

⁵ interview(22/10/2020)

⁶ interview(21/10/2020)

⁷ interview(22/10/2020)

there are some issues concerning the relation of Immuni with the ASL: I believe some operators don't know how to insert the codes. (Moody)⁸. Such a suspicion appears unfounded, at least under the technological point of view. The data collected with the secondary users have made clear that doctors in charge of contact tracing had been carefully instructed on the use of Immuni and were all capable of making the overall Immuni's system function correctly. *Immuni is so easy, it takes only 3 minutes, it is not long at all. It is a very small part of the all procedure of contact tracing, not so significant concerning the time required* (Contact tracing doctor)⁹

5.2 Cues to action

The second main theme observed in the data gathered is the cues to action. Usually, they are either internal (physiological cues) or external (related to information transmitted by external factors such as friends, media, or institutions). This study has focused only on external cues.

Almost all people interviewed expressed their disappointment towards the Immuni's marketing campaign arguing that the app was not promoted enough and with enough insistence, and the marketing campaign, conducted by the government, did not neither reassure citizens' regarding their privacy fear nor explain adequately the functioning of the app *Minister @robersperanza, as you can see from this hundreds of comments, most of the population did not understand how Immuni works. Why there is no informative advertisements on TVs, newspapers?#COVID19italia @MinisteroSalute (Mec)*¹⁰. This might have contributed to both spread confusion regarding the app and also dismissing it as a not relevant tool *I think that if the government actually cared about this project, they would have done more to promote it* (Lops)¹¹

5.3 Immuni's usability

This theme concerns with all the characteristics of the app that can influence its perceived usability and can impact on the perception of the app itself. Among usability design choices, the sub-theme of notifications has emerged. At the beginning, users complained about push notifications being too frequent and too disruptive. In an app designed only to inform about possible contagions, notifications should only be informative and should represent an infrequent, thus relevant, phenomenon.

Subsequently, users started to express worries concerning lack of feedback. Notifications had become not only sporadic but also not very evident. One user claimed that he had been informed of a risky exposition only after he had entered the app. *I saw the notification only as I entered the app, I didn't receive any*

⁸ interview(21/10/2020)

⁹ interview(5/11/2020)

¹⁰ tweet(10/10/2020)

¹¹ interview(26/10/2020)

notification, I didn't get a notification like when you receive a message. Nothing like that (Senator)¹². This could be extremely problematic: although the app itself asks the user to check one's status every day, the user has nothing to do within the app, so s/he is not encouraged or even reminded of opening the app regularly *And the app says "open Immuni once a day to check its status", but if you open the app, there is nothing to do there, so why would I open it everyday?* (Demetra)¹³. Many have perceived Immuni as defined by a lack of feedback as it does not provide any external stimuli or outputs on whether the system is working appropriately.

6 Discussion

As countries are facing several difficulties in running a successful vaccination campaign and the number of infected citizens remains dangerously high, digital contact tracing could be now even more than in the past a fundamental tool in containing the virus. Investigating all the factors that influence users' perception and attitudes towards the Italian CTA has proved to be an extremely complex and challenging task. As a matter of fact, several multi-layered factors are involved in influencing users' views and opinions concerning Immuni.

We found that the overall evaluation of the app is affected by three main clusters: the perceived benefits, the perceived barriers and the overall efficacy of the tool. These three factors are highly intertwined and related with one and other. These findings are in line with previous research, which have found the importance of privacy concerns and doubts over the mass uptake of then app as two relevant factors impacting CTA' citizen's evaluation. [10].

An external aspect that might have influenced users' perception of Immuni is the official marketing campaign as well as all the information circulating, both online and offline, regarding the app. Some have claimed that such a lousy campaign may have actually led to more reluctance and skepticism towards the app, as the communication failed in clarifying the purpose of the app and the way it worked. It also did not dispel the privacy fears of the citizens.

Concerning the overall usability, most people presented no issues in using the app, they found it simple to understand and easy to use. The main problems raised by primary users and by the virtual ethnography concerned with the design of exposure notification. Users are asked to check routinely the status of the app, but as there is no reminder or notification sent to the user, why would s/he check the app every day? This proves to be a major usability barrier, as it might prevent some users from discovering quickly of their risky exposition.

In conclusion, our research can shed a light on citizens' attitudes towards CTAs and open up new avenues of research in the area of attitudes towards CTAs.

¹² interview(25/10/2020)

¹³ interview(21/10/2020)

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