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Factors affecting the choices of adoption/non-adoption of future technologies during coronavirus pandemic

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A R T I C L E   I N F O
Keywords:
Telemedicine
ICT adoption
Theory of planned behavior
COVID-19

A B S T R A C T
The literature describes the potential for using future services technologies in public health emergencies. The ongoing coronavirus pandemic is resulting in unparalleled challenges to healthcare services in almost all countries, requiring innovative methods of practicing across health professions. Factors affecting pharmacists’ choice of telemedicine adoption/non-adoption are yet to be examined, especially in Italy. Thus, we investigate the behavioral intentions of pharmacists related to telemedicine, as a future services technology, in the current pandemic context. Our model draws on the theory of planned behavior and extends it to investigate the mechanisms underlying attitude formation to telemedicine adoption through a cross-sectional approach, using a questionnaire-based survey. The model has medium-to-high power in predicting telemedicine adoption intention, and the two significant direct antecedents of the target construct (attitude to telemedicine, and perceived behavioral control) are almost equally important. The psychological mechanisms linked to the tendency to implement emerging technology are complex and have major management effects. Studies in this field are yet to focus on the issues that affect the pharmacists’ decision regarding adopting or not adopting telemedicine, as a future services technology.

1. Introduction

On March 11, 2020, the World Health Organization declared that the ongoing coronavirus disease (COVID-19) outbreak is a pandemic. Further, by March 31, 2020, worldwide approximately 495 million total infections have been identified (Hsiang et al., 2020). The approaches adopted to respond to the pandemic comprise diagnosing infection at an early stage, isolating patients, monitoring of suspected as well as confirmed cases and symptomatic contacts, and imposing public health quarantine (Rosenbaum, 2020). In this scenario, Italy initially was among the first few countries to have been affected by the pandemic (Raccanello et al., 2020). Hence, serious concerns have been expressed whether the Italian National Health System (NHS) had the capacity to effectively fulfill the healthcare requirements of patients who were infected and those who require intensive care for this disease (Remuzzi and Remuzzi, 2020).

Certain studies have asserted that telemedicine, as a future service technology, in particular, would be useful for responding to disasters and public health emergencies and has to be considered a future services technology still underestimated in its potential (Laurie and Carr, 2018; Kristensson, 2019). Although it would be unrealistic to expect that a telemedicine program can be established within a short period (Durmusoglu et al., 2018), the COVID-19 pandemic is posing exceptional challenges to healthcare services (Adewale, 2004; Cegarra-Navarro and Sanchez-Polo, 2010). Hence, all health professions need to identify and use creative, flexible methods of practicing (Erku et al., 2020). In addition, for ensuring maximum use of the resources available at present, a comprehensive review of existing services must be conducted, and full use should be made of any unrealized potential among health-care providers. Community pharmacy is one of the various health professions that plays a crucial role as part of the response strategy to mitigate the COVID-19 pandemic. Moreover, telemedicine is a highly effective tool of this profession, given its two distinctive qualities: the immediacy of service to patients and the reduction of the load on hospitals and public first-aid institutions (Cuomo et al., 2020). However, the scale of community pharmacy practice differs significantly from country to country, and therefore, exploring the potential contribution of this profession to the public health response to the current pandemic and to maintaining healthcare service continuity is critical (Cadogan and Hughes, 2020). A few recent studies have investigated whether

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https://doi.org/10.1016/j.techfore.2021.120814
Received 16 October 2020; Accepted 12 April 2021
Available online 18 April 2021
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pharmacists are missing an opportunity by not using telemedicine to respond to the COVID-19 pandemic (Omboni, 2020). However, to the best of our knowledge, studies in this field are yet to focus on the issues that affect the pharmacists’ decision regarding adopting or not adopting telemedicine, as a future services technology. Hence, through this study we conduct an in-depth investigation of the behavioral intentions of a certain type of pharmacists in Italy, namely, those who are private owners of small retail shops, as regards telemedicine in the current pandemic situation.

2. Theory and research background

Telemedicine involves the use of information and communication technology (ICT) to securely transfer medical data and health information, through messages, sounds, and photographs, and in other forms, which are used to prevent and diagnose illnesses, to provide care and to monitor patients during recovery (Robinson et al., 2003). Healthcare providers can use telemedicine to combine all services and thus may be able to provide quicker diagnosis and to improve the efficacy and appropriateness of care (Hilligoss et al., 2019). This tool can be used for many health purposes related to three core service categories—diagnosis, care, and rehabilitation services. Diagnosis services are used to transfer diagnostic information on patients. Although healthcare providers cannot use telemedicine in isolation to conduct a full diagnostic procedure, they can use it to support the diagnosis and treatment process and to obtain valuable insights. Conversely, care services can be provided only once a diagnosis has been made and enable the healthcare provider to make therapeutic choices and assess prognostic trends. Rehabilitation services consist of therapy programs offered at home or at nursing centers, which are provided to people eligible for therapy because they are vulnerable, infants or elderly, or have a disability or medical condition (Chen et al., 2017; Sanders et al., 2012). In this regard, the ongoing COVID-19 pandemic has highlighted the importance of timely diagnosis, care, and rehabilitation, which are the main purposes that telemedicine can be used for effectively. Telemedicine services are classified into the two macro categories of specialized telemedicine and teleassistance (Cobelli, 2020).

The first, specialized telemedicine encompasses the different ways of providing remote care facilities within a particular medical specialty. It may occur between doctor and patient, or between doctors and other healthcare professionals. Specialized telemedicine can be performed on the basis of the nature of partnership between the participants (D’Andreamatteo et al., 2015). The second macro category, Teleassistance, comprises a system of social assistance to provide at-home care for the elderly or a frail individual by managing alarms and triggering emergency services and support calls from a service center (Pristera et al., 2020).

In the current scenario, establishing an effective telemedicine program is critical. The demographic patterns of Italy continue to change, which in turn, lead to changes in the population’s health needs, given the growing proportion of the aged and of those with chronic diseases, because of which it is important to revamp the configuration and organization of the service network, particularly for improving territorial assistance (Kaplan et al., 2015). Moreover, technological advances may lead to healthcare reorganization by promoting a change of focus from the hospital to the region in which health care will be provided, through creative citizen-centered forms of assistance as well as by enabling access to the region’s facilities (Venkatesh, 2020).

In Italy, numerous telemedicine programs, in the form of tests, inventions, and projects, have been introduced at the national level, but far too frequently, they are marked by restricted cases and high program mortality. Given this inorganic delivery of health care via the telemedicine approach, it is important to establish a common governance paradigm for these programs, which must provide awareness of the health sector as a focal level. To this end, first, telemedicine standards and implementation templates must be harmonized for maintaining the interoperability of telemedicine systems and for moving from an experimental framework to a well-defined framework of system use. In this background, in 2010 the Minister of Health formed a working group for telemedicine under the Superior Health Council, consisting of officials from the Ministry and representatives and experts from this Council. The National E-Care Observatory was established in 2007 under a special agreement between various regions in Italy and the Italian Ministry of Health. Its aim is to review and track telemedicine applications. Initially, the scope of the Observatory was limited to home treatment. Currently, it is gradually expanding its scope to include all areas of telemedicine to build a regional reference model. Further, the Observatory provides the regions a resource that enables them to have a clear, comprehensive view of Italy’s telemedicine service programs. This resource supports the electronic collection of forms related to each region’s projects. In addition, three Ministerial Decrees were issued on the “pharmacy of services,” of which two were issued on December 16, 2010 and one on July 8. These Decrees, which cover the delivery of drugs and skilled services that are paid for by families, have changed the pharmacy sector radically. These three Decrees emerged through the following process. On November 18, 2010, the Italian “Permanent Conference for Relations between the Government, the Regions and the Italian Autonomous Provinces” obtained a favorable opinion on the prospect of new services being offered by local pharmacies that are private companies focused completely on the population. On the basis of this favorable opinion, the three Decrees were issued. The Decrees essentially promote the option of delivering personal services at community-based pharmacies (Decree n. 57 of December 16, 2010; Decree n. 90 of December 16, 2010; Decree n. 229 of July 8, 2011; Italian Ministry of Health, 2012).

In this study, we focus on telemedicine, which is the topic of the first of the listed Italian Government Decrees. In general, the intent behind passing the Decree is to reduce waiting periods for health care (as reported by Mariotti et al., 2014). Indeed, states face the issue of long waiting periods when their public health program provides individuals with a minimal level of care (Nuti and Vainieri, 2012). The ongoing pandemic has overloaded the Italian NHS (Nacoti et al., 2020) with diagnostic and treatment services that could have been managed more effectively by community pharmacies through telemedicine. Although there are appropriate regulations that enable and encourage the use of telemedicine in the so-called service pharmacy, there is some opposition among pharmacists. According to the 2018–2019 report of the Observatory in Health of the Polytechnic of Milan (Observatory in Health of the Polytechnic of Milan, 2019), health facility operators and pharmacists have announced that they will use telemedicine solutions primarily during the testing process. Only 4% of the report’s sample use Teleassistance approaches, and 3% cent use Televisit for general practitioners. Conversely, the distribution of Teleconsultation facilities is higher, especially for certain first-level diagnostic practices, such as spirometry (21%) and electrocardiography (19%). Hence, in this study, we use scientifically proven research models to investigate the behaviors related to the propensity to adopt telemedicine as a technological innovation.

3. The research model

Over the past 30 years, the field of study of innovation adoption has developed rapidly (Oguzeynou, 2015). The model we propose in this study draws on the well-established theory of planned behavior (TPB) and extends it to investigate in greater depth the mechanisms underlying the formation of attitudes toward telemedicine adoption (Fig. 1). The TPB, developed by Ajzen (1985), indicates that individuals’ behavioral intentions are determined by their attitude, subjective norms, and behavioral control related to behaviors (see Figure A.1). The TPB extends the theory of reasoned action (Ajzen and Fishbein, 1980). To explain briefly, under the TPB, the attitude toward a behavior refers to the degree to which individuals evaluate that behavior favorably or
unfavorably. Subjective norms relate to the beliefs about whether “important” others would or would not approve of the individual engaging in the behavior. The TPB has been extensively applied in management studies to explain the intention to adopt new technologies (Lai, 2017; Marangunić and Granić, 2015). Overall, the available evidence indicates that attitude, subjective norms, and perceived behavioral control positively influence behavioral intention (Armitage and Conner, 2001). We draw on the TPB and extend it by considering the rational and emotional antecedents of attitude (performance expectancy and anxiety), as well as self-efficacy as a mediator.

The literature clearly demonstrates that an individual’s attitude is the result of distinct emotional and utilitarian components (Batra and Ahtola, 1991; Voss et al., 2003). Building on this distinction, we model performance expectancy and anxiety respectively as utilitarian and emotional sources of attitudes. Performance Expectancy is the degree to which people believe that using a technology will help them to improve job performance (Venkatesh, 2000, 2003). Performance expectancy positively influences the attitude to the technology (Batra and Ahtola, 1991). In addition, anxiety plays a key role in technology adoption. Anxiety is defined as an emotional response resulting from a fear of using a technology (Mac Callum and Jeffrey, 2014). More precisely, it arises from the perceived inability to manage technology effectively (Oyedele and Simpson, 2007). Hence, anxiety can negatively influence the attitude toward the technology (Tsai et al., 2019).

In modeling the impact of performance expectancy and anxiety on attitude, we relied on the theory of self-efficacy, which explains an individual’s outcomes when facing an uncertain situation (Bandura, 1986, 1999). The individual’s self-efficacy level, that is, the belief about having the ability to successfully perform a task, influences these outcomes (Bandura, 1992). Therefore, the effects of the antecedents (in this case, performance expectancy and anxiety) on the outcome (in this case, the attitude) are mediated by self-efficacy. In other words, according to this theory, the antecedents will affect the attitude by changing the individual’s self-efficacy level. We used a series of control variables, such as the respondent’s age, experience in the sector, experience in the specific pharmacy under investigation, and role. Therefore, we suggest the following hypotheses:

Hypothesis 1: Attitude to telemedicine has a positive effect on the intention to adopt telemedicine.

Hypothesis 2: Subjective norms have a positive effect on the intention to adopt telemedicine.

Hypothesis 3: Perceived behavioral control has a positive effect on the intention to adopt telemedicine.

Hypothesis 4: Performance expectancy has a positive effect on the attitude to telemedicine, and this effect is fully mediated by self-efficacy.

Hypothesis 5: Anxiety has a negative effect on the attitude to telemedicine, and this effect is fully mediated by self-efficacy.

4. Methods

This study used a cross-sectional approach and a questionnaire-based survey. Given its objective of examining the decision-making regarding telemedicine adoption by pharmacists as retailers, the first challenge was choosing a process to recruit participants. Thus, we selected a recruitment process that comprised several steps targeted at achieving participation by pharmacists in the different Italian provincial regions. To recruit the targeted sample, we had to develop a positive relationship with these health professionals, acquire their consent after ensuring that
they were participating voluntarily, and concurrently optimize the costs related to data collection. In March 2020, we sent an engagement message to potential participants through Certified Emails because sending Certified Emails to contact a target population is mandatory under Italian laws. In this message, we summarized the research aims and invited pharmacists interested in the research area to state whether they were interested in participating in our study. These following participant inclusion criteria were identified:

- Participants had to be owners or managers of pharmacies, since it was assumed that they were the business decision-makers. Although many stakeholders (e.g., employees, customers, and general practitioners) can influence the telemedicine adoption decision, business owners and managers take the final decision.
- The pharmacies had to be independent and not those managed and controlled by the Municipalities and Regions. This choice was made with the strong conviction that decision-makers for the latter are not pharmacists, but public authorities. The inclusion of this category of pharmacies would have generated an uneven sample.
- The pharmacies had to be qualified by the Italian Association of Private Pharmacies (Federfarma) for telemedicine adoption.

Through this process, we identified 500 potential participants. The contact details of pharmacists indicating their willingness to participate in the study were used to invite them to complete an online questionnaire. The survey was administered in April–May 2020 by two researchers experienced in conducting telephone surveys. This process resulted in 156 completed questionnaires. This relatively low response rate is essentially attributable to the extensive work that every operator, both public and private, had to undertake in the first months of the pandemic for adopting measures aimed at containing the contagion in line with the various Ministerial Decrees that gradually became mandatory. Among these operators, pharmacists were among the categories of professions who were allowed to work without interruptions, even in the period of full pandemic. Hence, the drop-in responses compared with the sample size originally identified is not surprising. The main characteristics of the sample are summarized in Table 1.

The questionnaire consisted of multiple-item measures for all the constructs in the model. The measures, taken from previous studies, were adapted slightly to the research context (see Table 2). Venkatesh et al. (2003) study was the primary source for the measures. We measured all constructs using a 7-point Likert scale (1 = totally disagree; 7 = totally agree). The control variables were operationalized as follows:

### Table 1
Descriptive Statistics of the Sample.

| Respondents' characteristics | Frequency (n = 156) |
|-----------------------------|---------------------|
| Age                         |                     |
| <35 years                   | 16                  |
| 35–44 years                 | 33                  |
| 45–54 years                 | 45                  |
| 55–64 years                 | 41                  |
| 65+ years                   | 21                  |
| Experience in the sector    |                     |
| <3 years                    | 2                   |
| 3–5 years                   | 14                  |
| 6–10 years                  | 18                  |
| 11–15 years                 | 26                  |
| 15+ years                   | 96                  |
| Experience in the specific pharmacy |      |
| <3 years                    | 1                   |
| 3–5 years                   | 3                   |
| 6–10 years                  | 19                  |
| 11–15 years                 | 16                  |
| 15+ years                   | 117                 |
| Role                        |                     |
| Owner                       | 127                 |
| Manager                     | 29                  |

### Table 2
Measurement Model Evaluation.

| Construct                        | Item                                                                 | Outer loadings | Average variance extracted | Composite reliability |
|---------------------------------|----------------------------------------------------------------------|----------------|----------------------------|-----------------------|
| Attitude toward telemedicine    | Att1: Using telemedicine would be a good idea.                       | 0.921          | 0.786                      | 0.936                 |
|                                 | Att2: Telemedicine would work more interesting.                      | 0.876          |                            |                       |
|                                 | Att3: Working with telemedicine would be fun.                        | 0.861          |                            |                       |
|                                 | Att4: I would like to work with telemedicine.                        | 0.887          |                            |                       |
| Perceived behavioral control    | Pbc1: I would have the necessary resources to use telemedicine.       | 0.805          | 0.641                      | 0.842                 |
|                                 | Pbc2: I would have the knowledge necessary to use telemedicine.       | 0.877          |                            |                       |
|                                 | Pbc3: A specific individual (or group) would be available to assist with telemedicine. | 0.713          |                            |                       |
| Subjective norms                | Sn1: People who influence my behavior think that I should use telemedicine. | 0.894          | 0.737                      | 0.893                 |
|                                 | Sn2: People who are important to me think that I should use telemedicine. | 0.931          |                            |                       |
|                                 | Sn3: The Local Pharmacy Association of this business has been helpful in the use of telemedicine. | 0.739          |                            |                       |
| Intention to adopt              | Int1: I intend to use telemedicine in the next months.               | 0.972          | 0.936                      | 0.978                 |
|                                 | Int2: I predict I would use telemedicine in the next months.         | 0.952          |                            |                       |
|                                 | Int3: I plan to use telemedicine in the next months.                 | 0.978          |                            |                       |
| Performance expectancy          | Per1: I would find telemedicine useful in performing my job.         | 0.850          | 0.657                      | 0.884                 |
|                                 | Per2: Using telemedicine would enable me to accomplish tasks more quickly. | 0.808          |                            |                       |
|                                 | Per3: Using telemedicine would increase my productivity.             | 0.811          |                            |                       |
|                                 | Per4: Using telemedicine would increase my chances of getting a raise. | 0.771          |                            |                       |
| Anxiety                         | Anx1: I feel apprehensive about using telemedicine.                  | 0.828          | 0.759                      | 0.926                 |
|                                 | Anx2: It scares me to think that I could lose a lot of time using telemedicine. | 0.907          |                            |                       |

(continued on next page)
each respondent’s age, experience in the sector, and experience in the specific pharmacy under investigation were measured in terms of number of years, whereas for the respondent’s role, a dummy variable was used (0 = owner; 1 = manager). The collected data were analyzed using partial least squares–structural equation modeling (PLS-SEM), which is particularly suitable when the goal is to predict a key target variable, such as, in this study, the intention to adopt telemedicine (Hair et al., 2017). PLS-SEM is a nonparametric method. Therefore, unlike covariance-based structural equation modeling, it is free from specific data distribution assumptions. PLS-SEM requires the sample size to be larger than 10 times the largest number of structural paths directed at a particular construct in the structural model (Hair et al., 2017). In our model, the intention to adopt receives the largest number of paths (seven, including the control variables). Therefore, the minimum sample size should be 70 and the sample (n = 156) used in this study meets this requirement. We used the software SmartPLS 3 to conduct the analysis.

Before assessing the structural model and the related hypotheses, we evaluated the measurement models. In line with the established conceptualizations and the selected measures, all constructs were measured reflectively. Therefore, we evaluated the measurement models according to the following criteria: internal consistency reliability, convergent validity, and discriminant validity (Hair et al., 2019). For all constructs, composite reliability exceeded 0.70, indicating that internal consistency reliability had been met (see Table 2). In addition, all the outer loadings were greater than 0.70 and all average variance extracted values were higher than 0.50, confirming that convergent validity had been reached. Finally, discriminant validity was met since the average variance extracted for each construct was greater than its maximum and average shared variance (Fornell and Larcker, 1981).

5. Results

We considered collinearity issues, the significance and relevance of the structural model relationships, the R² level, the f² effect sizes, the predictive relevance and Q² in assessing the structural model (Hair et al., 2019). First, as regards collinearity, all variance inflation factors for each subpart of the structural model were well below the critical level of 5 (the highest value was 2.09). Second, to assess the significance and relevance of the structural model relationships, we applied bootstrapping (5000 subsamples, bias-corrected and accelerated bootstrap, two-tailed test). Table 3 summarizes the bootstrapping results.

The results showed that both attitude to telemedicine and perceived behavioral control had strong and significant effects on the intention to adopt telemedicine (β = 0.430, p < 0.01 and β = 0.421, p < 0.01, respectively), but subjective norms did not (β = 0.091, p > 0.10). Hence, hypotheses 1 and 3 were supported, and hypothesis 2 was rejected. Hypothesis 4 suggested that performance expectancy has a positive effect on attitude to telemedicine and that this effect is fully mediated by self-efficacy. The findings revealed that the indirect effect of performance expectancy on attitude through self-efficacy was significant (β = 0.148, p < 0.01). Therefore, self-efficacy acts as a mediator. However, performance expectancy also had a significant direct effect on attitude (β = 0.435, p < 0.01). Thus, performance expectancy is a partial, and not a full, mediator as expected, and hypothesis 4 was rejected. Finally, hypothesis 5 predicted that anxiety has a negative effect on attitude toward telemedicine and that this effect is fully mediated by self-efficacy. The findings confirmed that the indirect effect of anxiety on attitude through self-efficacy was significant and thus supported hypothesis 5. Nonetheless, it should be noted that the indirect effect of anxiety was rather small. Third, the analysis showed the coefficient of determination R² value of 0.636 for the target construct (intention to adopt telemedicine), revealing that the model has high predictive power. The f² effect sizes were then inspected (fourth step) to assess whether the predictors have substantial effects on the target construct. In particular, the f² effect sizes for both attitude toward telemedicine and perceived behavioral control (0.292 and 0.295) revealed medium-to-large effects. Next, a blindfolding procedure with the omission distance of 7 was applied to assess the predictive relevance Q² (out-of-sample predictive power) of the antecedents of the endogenous construct. The analysis indicated that the value of Q² for the intention to adopt telemedicine was higher than zero (0.575), confirming that the antecedents have predictive relevance for the endogenous construct under consideration.

In sum, the analysis indicated that the model has medium-to-high power in predicting the intention to adopt telemedicine and that the two significant direct antecedents of the target construct (i.e., attitude to telemedicine and perceived behavioral control) are almost equally important. Finally, as regards the control variables, only the respondent’s role had a significant effect, which shows that managers have
higher adoption intentions than owners, but this effect was rather small ($\beta = 0.090$, $p < 0.10$).

6. Discussion

In the recent past, European countries, including Italy, have enacted laws with a growing focus on decentralized, community-based healthcare systems. However, these laws would not succeed in making telemedicine an interesting phenomenon, worthy of consideration. As discussed in this study, the emergence of telemedicine indicates the need to restructure existing health systems because these are perceived to be inefficient in terms of the related costs and benefits. In the case of Italy, 2009 is considered the year that third millennium drugs emerged in the country. However, it was in 2014 that the role of the pharmacy paradigm and its impact at the institutional level toward the territorial provision and de-hospitalization of Italy’s NHS were fully acknowledged. Thus, through this process, the value of the pharmacy in delivering services for primary care rehabilitation was emphasized. Against this background, Italy has encouraged the development of future services technologies applications focused on healthcare systems, which concerns doctors, hospital management, nurses, data management specialists, social security administrators and, certainly, patients, in terms of disease prevention or improved disease management (Bucoliero, 2010). Telemedicine is an innovation to which several disciplines, such as medicine, IT, and business economics and statistics, can contribute, and its development cannot be planned without sufficient, timely information on this phenomenon (European Commission, 2008).

Although programs have been proposed to carry out technological changes to Italy’s NHS, to date, these have not progressed beyond the early developmental stage and are unrelated, mainly because of the inadequate collaboration between existing initiatives. The program heterogeneity is exemplified by the availability of records that differ considerably, both at individual healthcare institutions and at the national level, which makes the tracking of changes in future services technologies over time an impossible task. The resulting limitation of the lack of sufficient data adversely affects the implementation of telemedicine reward policies. Thus, this study shows that even traditional healthcare professionals, including pharmacists, and in particular, Italian pharmacists who typically work in small and medium-sized family businesses (Schmidt and Pioch, 2004), may be protagonists of reform in this situation.

7. Conclusions

All stakeholders affected by a proposed change would need time for acceptance, familiarization, and belief. As regards telemedicine, the change also requires responding to competition and imitation as well as reputation enhancement. However, the failure to implement telemedicine is not fundamentally associated with unfavorable attitudes or resistance to change. As revealed in field studies, many complex factors influence the psychological mechanisms that are linked to the tendency to implement a new technology, and these have major management effects. In addition, there are observable latent constructions that suggest a greater or lesser tendency for technical advancement. Attentive managers will be able to take advantage of the great opportunities that await them, both during the pandemic period and in the post-pandemic period. As the Italian Prime Minister recently said, if there has been any positive consequence of this pandemic, it is to be found in the technological leap forward that COVID-19 has imposed on citizens. Certainly, all these outcomes bring along a great social impact. Currently, a large part of the world’s population, or at least of the Italian population, is aware of the extent to which new technologies can assist in facing an emergency that has not yet passed but that has found a possible response in technology, both in terms of the virtue and the reduction of social distancing, through the proximity services that the community-based pharmacist can guarantee. Therefore, a more positive inclination for adopting telemedicine may have arisen in pharmacists, as expected by patients. In this scenario, entrepreneurs and business managers can certainly capitalize on new opportunities or on opportunities for projects that have never been structurally established but are in the formation stage in many areas of Italy.

8. Limitations and further research

This study has certain limitations. First, convenience sampling was used to maximize the survey response rate. Hence, it can be considered that only pharmacists who were interested in the study contacted the researchers, leading to potential selection bias. Second, we used narrow criteria for identifying participants, which could have affected the study results. Therefore, there are several future research opportunities. For instance, a future study could conduct a survey and compare the data from pharmacists who have adopted telemedicine with data from non-adopters. Further, studies conducted in other locations and countries using different sampling methods would help to determine whether this study’s results are generalizable to those contexts. Moreover, Italy may have poor market penetration and adoption of telemedicine tools compared with certain other countries because of factors associated with the differences in the roles of Italian health actors and those in the other countries. Extending this study’s results to other empirical settings would facilitate an improved understanding of the ways in which telemedicine adoption might be promoted for improving the quality of life of a large part of the Italian population.

In addition, future studies should test an extended model that incorporates other significant factors likely to influence telemedicine adoption. Specifically, these studies could investigate methods of fostering interprofessional collaboration to develop a service network among healthcare professionals based on a holistic consumer-centric perspective (Cobelli et al., 2014; Jaeger et al., 2017). Lastly, although telemedicine, as a technological innovation, has been receiving extensive attention, many aspects of the psychological and managerial mechanisms related to the adoption and use of this technology in community-based private practice remain to be investigated and understood. Therefore, this study can be considered an initial step from the managerial viewpoint for future healthcare professionals and patients.

CRediT authorship contribution statement

Nicola Cobelli: Conceptualization, Methodology, Software, Data curation, Writing - original draft. Fabio Cassia: Software, Validation, Writing - review & editing. Roberto Burro: Visualization, Investigation.

Declaration of Competing Interest

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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