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Exploring the impact of trust dimensions on COVID-19 vaccination intention and behavior: A quantitative analysis

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ABSTRACT

The rapid proliferation of COVID-19 vaccines has emerged as a pivotal strategy to combat the ongoing pandemic. Vaccine hesitancy, influenced by various vaccine-related factors, significantly impacts the adoption of COVID-19 vaccination. Misinformation contributes to vaccine distrust and hinders individuals' willingness to receive the vaccine. Despite its critical importance, there remains a paucity of comprehensive studies focusing on the determinants of vaccine confidence, leading to a deficiency in implementation research aimed at understanding and modifying individuals' behavior towards COVID-19 vaccination. This research endeavors to examine the influence of three key dimensions of trust in the COVID-19 vaccine, namely vaccine reliability, transparency in information dissemination, and pharmaceutical laboratory investment in innovation, on individuals' intention to receive the vaccine. Furthermore, we investigate the repercussions of these dimensions on actual COVID-19 vaccination behavior. Our quantitative study comprises a sample of 240 participants and employs a rigorous analytical approach. The findings underscore that individuals' intent to vaccinate against COVID-19 is positively affected by all three trust dimensions, i.e., drug reliability, innovation investment, and information transparency. Importantly, this intention positively correlates with actual vaccination behavior. This study substantiates the utility of the behavioral approach and the Theory of Planned Behavior (TPB) in elucidating vaccine hesitancy and the factors exerting influence on vaccine uptake.

1. Introduction

It is an undeniable fact that a considerable number of individuals have tragically lost their lives due to the COVID-19 pandemic, affecting a staggering global population exceeding 666.947 million, resulting in a devastating death toll surpassing 6.723 million (as reported by esteemed institutions such as Hopkins University and national public health agencies). This virulent virus, known as COVID-19, persistently undergoes evolution and propagation, giving rise to the emergence of novel and concerning strains. Consequently, COVID-19 has been declared a global health crisis, posing not only an acute strain on healthcare facilities and medical institutions but also engendering substantial organizational and economic challenges on a global scale (Abdi et al., 2021).

Since the beginning of the health crisis, pharmaceutical laboratories around the world have played an essential role in the response to the COVID-19 pandemic. The World Health Organization (WHO) has worked tirelessly with its partners to develop, manufacture, and deploy safe and effective vaccines to meet the new and growing demands of the pandemic. Accelerating the vaccination campaign is the key factor in ending the COVID-19 pandemic (Dourado, 2020). Nevertheless, the vaccination rate against COVID-19 in some countries remains low. The scientific community and health professionals have expressed concern about COVID-19 vaccine resistance worldwide (Khubchandani et al., 2021). Vaccine distrust is a behavior that is influenced by a number of factors, including issues of trust (not trusting vaccines or laboratories) and complacency (not perceiving the need for a vaccine) (Dubé et al., 2014).

Vaccine Trust is the belief that vaccination, and vaccine providers, the private sector, and political

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actors that support it, serve the health interests of the public and its constituents (Bardosh et al., 2022).

Indeed, there is little research on the factors related to developments in vaccine trust and their effects on citizen behavior. This is the context of our research objective in which we are interested in determining the role of trust in the COVID-19 vaccination process.

In the literature review section, this article first presents the theoretical concepts used, namely vaccine trust, behavioral intent, and behavior. Then, we present the empirical test of the model in order to measure the impact of trust on the behavior of getting vaccinated against COVID-19. In the third part, we test structural models using structural equation modeling techniques and discuss the results obtained.

2. Literature review

A synthesis of the literature highlighted several definitions specific to trust. It is defined as: A belief (Morgan and Hunt, 1994) an expectation (Dwyer et al., 1987), a presumption (Gurviez and Korchia, 2002), a behavioral intention (Moorman et al., 1992), and a process that evolves over time between partners (Akrout and Akrout, 2010). Based on the work of Deutsch (1958), trust is determined by the intentions and cross-expectations of those involved in an exchange situation. In the same idea, other authors have defined trust as "the willingness to rely on an exchange partner in whom one trusts" (Moorman et al., 1992), trust is a polysemous construct whose definition depends on the context in which it is studied (Guibert, 1999). The analysis of the literature was carried out according to the behavior approach proposed by Chaudhuri and Holbrook (2001). The behavioral approach is essentially related to the conative aspect and composed of two angles: Intention of behavior or confident behavior

In the current context of the Coronavirus (COVID-19) pandemic, health management is becoming a major concern for citizens as well as for health professionals and experts. It is extremely encouraging to see so many vaccines being proven and developed. The rapid development of COVID-19 vaccines has required a process that uses new technologies, and relatively short clinical trials, and the proposed use of conditional, provisional, or emergency use authorization regulatory processes may raise questions and concerns among healthcare providers and citizens (Filip et al., 2022).

Indeed, many consumers are expressing their distrust of the new COVID-19 vaccine. According to a recent survey conducted by the Kantar database (www.kantar.com), the mistrust around the vaccine can be explained by the very rapid conditions of its development and experimentation (Cascini et al., 2022).

Previous research on trust in the medical domain, thus, reveals a consensus among researchers as to the specificities of this concept. Few studies explored trust in the health domain. As a result, trust in medicine is a difficult construct to conceptualize and operationalize (Andreani et al., 2014).

Based on this observation and the behavioral approach, trust in the vaccine is considered a behavioral variable upstream of behavioral intention (Morgan and Hunt, 1994).

In the marketing literature, dimensions of trust have been developed in different contexts. In the drug domain, Andreani et al. (2014) determined the dimensions of trust in the drug by drawing on work in consumer behavior, which aims to measure trust in a product category (drug) (Andreani, et al., 2014). The trust in the drug is represented in five dimensions; namely: Reliability, investment in innovation, transparency of information, the credibility of actors, and societal responsibility. According to Andreani et al. (2014), the last two dimensions are expressed to health professionals (doctors, pharmacists, and health authorities) and not to consumers.

Previous research (Chuang et al., 2015; Rönnerstrand, 2014), regarding health decision-making, has shown that behavioral intentions (i.e. willingness to be vaccinated) are caused by trust in the vaccine. Thus, trust is a key factor in affecting behavioral intention (Bart et al., 2005; Chen and Dibb, 2010).

The concept of behavioral intention is inspired by the theory of reasoned action (TRA) and the theory of planned behavior (TPB). Both theories were created for the purpose of predicting, explaining, and modifying behavior (Ajzen and Fishbein, 1980; Giger, 2008). Following the theory of reasoned action (TRA), an individual's behavior is directly determined by his or her intention to perform that behavior.

Several research studies have measured purchase intention in the literature. Starting with work in health marketing that considers behavioral intention as generally used to describe the acceptance and continued use of health services. The work of Zoghlami et al. (2021) showed that consumers' behavior to prevent themselves from COVID-19 is affected by the intention to use e-health. In this study, behavioral intention refers to whether consumers would continue to get vaccinated. Therefore, we present the following hypotheses:

H1: Vaccine trust has a positive effect on the intention to be vaccinated against COVID-19.
H1-1: Vaccine reliability has a positive effect on the intention to vaccinate against COVID-19.
H1-2: Investment in innovation has a positive effect on the intention to be vaccinated against COVID-19.
H1-3: Transparency of information has a positive effect on the intention to be vaccinated against COVID-19.
H2: Intention to be vaccinated against COVID-19 has a positive effect on vaccination behavior.

The conceptual framework used and the proposed hypotheses are summarized in Fig. 1.

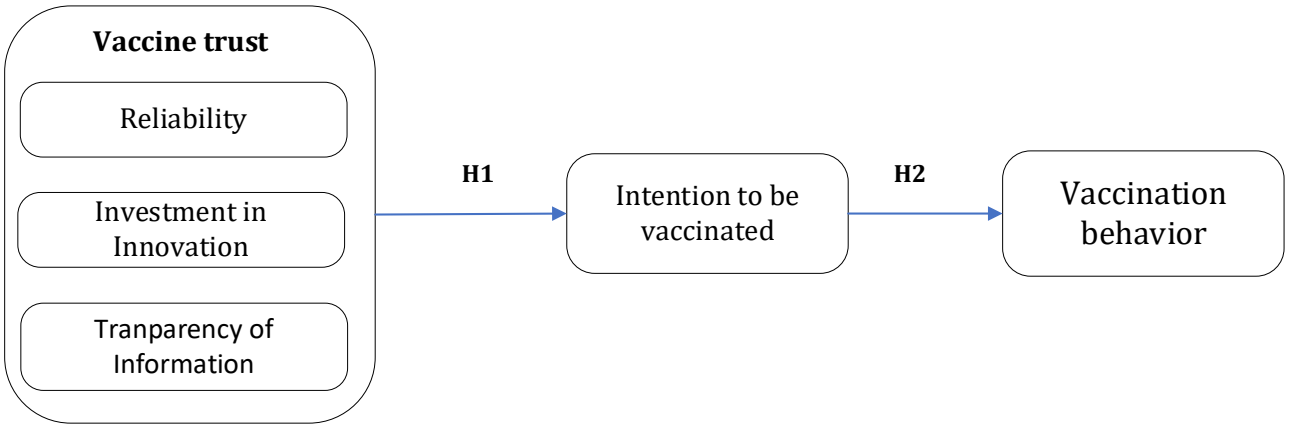

Fig. 1: Conceptual model

3. Methodology

A questionnaire was posted online via Google Online Survey. The questionnaires were disseminated via online health discussion forums with a brief presentation of the objective of the study. We obtained 240 responses through this channel, with more than 85.2% of women and an average age between 30 and 39 years old. Nearly 93.4% of the surveyed population had a university education. More than 42.2% of our sample are Tunisian and 35.2% French.

In order to operationalize the research constructs, we used measurement scales borrowed from the literature. For vaccine confidence, these items are taken from studies conducted by Andreani et al. (2014), regarding the variables of intentions and behavior. The scales are borrowed from Godin et al. (1999) which is based on the work of Ajzen and Fishbein (1980).

The measure of the variable "Vaccine trust" was assessed using a five-point Likert scale. The variable "intention to get vaccinated" was measured by three items on a five-point Likert scale 'totally disagree to totally agree.' "Vaccination behavior" was measured on a 5-point Likert scale "never to very often."

4. Results and interpretation

The identification of the relationships between the items of the measurement instruments is performed by a principal component analysis (PCA) with Varimax rotation. We performed a principal component analysis using SPSS 18.0 to clean up the measurement scales used in our research. The results of the PCA allowed us to remove the items with representation quality values lower than 0.5. Subsequently, we used Cronbach's Alpha to test the reliability of each of these variables. These coefficient values exceeded the 0.70 level for all variables (Nunnally and Bernstein, 1994). These results attest to the reliability of the variables in our research.

In order to model the causal relationships represented in the research model, the Partial Least Squares (PLS) approach was adopted. The analysis procedures are carried out in two stages: A first confirmatory phase to assess the measurement quality of the model, followed by a second phase that consists of examining the structure of the model and thus testing the research hypotheses.

The confirmatory analysis allows us to test the reliability and validity of the constructs. The indices of internal consistency reliability (CR), are satisfactory for all the constructs which indicate values higher than 0.7 (Vinzi et al., 2010). In general, all the indicators of Cronbach's alpha are satisfactory, oscillating between 0.6740 and 0.9872, which implies good reliability of the measurement scales from the point of view of Hair et al. (2014).

In addition, the procedure of Fornell and Larcker (1981), was followed by calculating convergent validity and discriminant validity. The convergent validity of our model is established, with AVE values greater than 0.5.

The results of the confirmatory analysis are presented in Table 1.

Table 1: The convergent validity of constructs

Constructs	Average	Consistency reliability	Cronbach's alpha
Reliability	0.9373	0.9782	0.9662
Investment in innovation	0.5869	0.8030	0.7137
Transparency of information	0.9288	0.9631	0.9234
Intention	0.8594	0.9482	0.91878
Behavior	0.8712	0.8403	0.7581

The discriminant validity of each construct is tested by comparing the square roots of the AVEs) of the latent variables with the correlation of the other latent variables (Wetzels et al., 2009). As shown in Table 2, the discriminant validity of this study is assured. Regarding the structural model, the R2 is 0.2873 for intention to vaccinate and 0.3915 for behavior, these R2 values show that the values exceed the threshold of 0.26 (high threshold) (Wetzels et al., 2009). The GoF value of our structural model is 0.53 (greater than 0.36), indicating that the model fit is good.

Table 2: The discriminant validity

	Behavior	Reliability	Transparency of information	Intention	Investment in innovation
Behavior	0.933				
Reliability	0.8837	0.9681			
Transparency of information	0.8847	0.9358	0.9637		
Intention	0.3500	0.3489	0.3485	0.9270	
Investment in innovation	0.7906	0.8419	0.8209	0.4966	0.7660

The causal model allows us to test the research hypotheses as well as the intensity and significance of the causal links between the variables. In this study, all of our research hypotheses are confirmed at the 5% level. The results show that the reliability of medicines, investment in innovation, and transparency of information, exert a positive impact on the intention to be vaccinated to protect against COVID-19. In the same way, the intention to vaccinate to protect against COVID-19 has a positive impact on citizens' behavior, which then supports research hypotheses H1 and H2. Table 3 presents the regression coefficients and Student's t-significance coefficients.

Table 3: The result of the hypothesis test

Causal relationship	Coefficients β	T of student	Validation status of hypothesis
H1-1: Reliability →intention	2.0730	2.0465	Validated
H1-2: Innovation →intention	0.8065	5.8725	Validated
H1-3: Transparency of information →intention	1.8234	1.9624	Validated
H2: Intention→behavior	0.3500	4.2544	Validated

As presented in Table 3, the results of the study show that drug reliability and investment in innovation are strong predictors of behavioral intention against COVID-19. The Vaccine Reliability dimension, which includes quality, therapeutic effects, and safety, is a predictor of intention (beta=2.0730; t=2.0465). This result is consistent with Lazarus et al. (2021), which found that 72% of the 13,400 respondents said they would get vaccinated if an available COVID-19 vaccine demonstrated efficacy and safety, while 14% would refuse and 14% were hesitant. Similarly, the dimension of investment in innovation is seen as the good intentions of pharmaceutical companies and their willingness to do whatever is possible to relieve patients and improve their health (Andreani et al., 2014).

The variable transparency of information was found to be relevant and played a significant role in behavioral intention (beta=1.8234; t=1.9624). This suggests that the different actors should be well aware of the therapeutic effects, side effects, and the proper use of vaccines through communication channels. According to Andreani et al. (2014), information is a facet of trust development through updated knowledge of therapeutic effects, recommendations for proper use, and institutional information given by health authorities.

5. Conclusion

In this research, we investigated the role of trust in the development of COVID-19 vaccination intention and behavior. With this in mind, the study found that two major variables determine citizens' trust. The first is related to trust in a product (vaccine reliability and investment in innovation) and the second is related to trust in companies, namely: Transparency of information.

Trust in vaccines has a stronger effect on the intention to vaccinate. If patients have demonstrated a high level of trust in the vaccine, they are more likely to continue their behavior (Hong et al., 2019). Trust must be developed to affect citizens' behavior toward the COVID-19 vaccine.

This study has both theoretical and practical implications. From a theoretical perspective, the established research model provides a new perspective on citizens' behavioral intentions that are predicted by trust in COVID-19 vaccines.

Intention to be vaccinated against COVID-19 increased significantly by the development of trust. From a practical perspective, this research is particularly important in addressing vaccination issues and ending the COVID-19 pandemic. Vaccination behavior is determined by factors related to trust in both vaccines and drug companies. As such, every effort should be made to improve the health and well-being of citizens. Today, such an endeavor requires rethinking, at least in part, the strategies to mitigate and overcome this pandemic (Homma et al., 2021). Laboratories are called upon to optimize the management of relational benefits with healthcare professionals and citizens.

To build confidence in COVID-19 vaccines, governments, and healthcare providers need to change their approach to citizens by providing them with all the necessary information about the types of vaccines. Providing patient counseling using patient-centered motivational techniques in patient-caregiver interviews can help build confidence in vaccines (Verger and Dubé, 2020).

Trust in the COVID-19 vaccine can only improve if efforts are made to increase public confidence in the efficacy and safety of the vaccine (vaccine reliability) through reliable, clear, and available information that can affect some vaccine hesitancy.

To succeed in the vaccination campaign, pharmaceutical companies must therefore engage the various stakeholders such as associations and social actors in an international strategy whose content is adapted to all contexts and all audiences. This adaptation is necessary in order to avoid any negative behavior towards vaccination.

However, some limitations should be noted that can be presented as suggestions for future research. As we did not take into account socio-demographic factors such as age, gender, and education level in our model, it would be interesting to introduce these variables and see their effects on the behavior and willingness to get vaccinated against COVID-19.

Nevertheless, our study is not without limitations, which we present as alternatives for future research. Because we did not include the variables age, gender, and chronic diseases in our model, it would be interesting for future research to include these variables and examine their effect on vaccination behavior.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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