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Critical Factors Affecting the Participation in COVID-19 Vaccination Program in Residency of Surakarta: The Extended Theory of Planned Behaviour

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Abstract

Objective: This study evaluates the critical factors affecting COVID-19 vaccine acceptance in Indonesia using a proposed extended theory of planned behaviour (extended-TPB).
Design/Methods/Approach: We conducted an online survey (N = 222 respondents) using a valid and reliable questionnaire to evaluate people's intention to take the COVID-19 vaccination. A structural equation modeling was performed to demonstrate the impact of religious acceptance (RA), vaccine safety (SF), trust (TS), perceived behavioural control (PBC), attitude towards vaccination (ATT), and subjective norms (SN), on intention (IN) to accept COVID-19 vaccine.
Findings: The results show positive relationships of all hypotheses except the correlation between RA and TS. TS becomes a positive determinant of ATT, SN, PBC, and INT, and TS is influenced by SF but not by RA. TS is the key determinant factor of intention to uptake the COVID-19 vaccine.
Originality: This study used a proposed extended TPB by adding trust, religious acceptance, and safety as additional components of TPB to predict the intention to participate in COVID-19 vaccination. This study is essential because the vaccine is believed to be the best strategy to deal with virus-related diseases, such as COVID-19. However, there is a lack of information on the multifactor effects of Indonesian people's acceptance of vaccination, especially among Surakarta residents.
Practical/Policy implication: This research can be a recommendation for the Indonesian government to elevate public intention to take the COVID-19 vaccine, especially by implementing policies that accentuate people's trust by confirming and publishing information about the vaccine safety.

Keywords: COVID-19 Vaccine, Religious Acceptance, Theory of Planned Behaviour, Trust, Vaccine Acceptance

JEL Classification: I12, I18

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1. Introduction

Coronavirus disease (COVID-19) is an outbreak which firstly detected in Wuhan, China, in December 2019. It was announced as a global pandemic affecting more than 25 countries in March 2020, leading to an exponential growth of cases (Dong et al., 2020). As the vaccine is thought to be the best strategy to deal with the pandemic, 172 vaccine candidates are reported to be in the preclinical stage, while the remaining 60 are in the clinical stage. Some countries such as the UK, US, Russia, China, and United Arab Emirates have started the COVID-19 vaccination programs by approving some vaccines brand under emergency use authorization (EUA), including Pfizer-BioN-Tech (BNT162), Moderna (mRNA-1273), AstraZeneca (AZD1222), Sputnik V, EpiVac-Corona, Sinovac (Corona-Vac), and Sinopharm (BBIBP-CorV) (Kashte et al., 2021). Each vaccine is unique due to the pathogen's characteristics, disease's property, and the population targeted for administration (Syahniar et al., 2020). The vaccine brand was reported to affect customers' acceptance of the COVID-19 vaccine (Amit et al., 2022).

As the fourth largest populated country with many COVID-19 cases, Indonesia implemented a mass vaccination plan to reduce transmission, morbidity, and mortality due to the virus and achieve herd immunity. This plan was conducted according to the Decree of the Director-General of Disease Prevention and Control Number HK.02.02/4/1/2021. Based on this decree, the vaccination will be conducted in several stages using several types of vaccines. It includes inactivated virus type (Sinovac Research and Development Co., Ltd; and Sinopharm + Beijing Institute of Biological Products), viral vector (Novavax), and RNA-based (Moderna and Pfizer) (Kemenkes RI Dirjen P2P, 2020). However, it is essential to note that only a few of these vaccines passed the clinical trial stage; therefore, public rejection is still possible due to concerns over their safety.

The Indonesian Ministry of Health and the Central for Disease Control and Prevention (CDC) showed that only 65% of Indonesian citizens said they would accept the vaccination plan. In comparison, 8% refused, and the rest were reluctant to uptake the vaccines (The Ministry of Health, NITAG, UNICEF, and WHO, 2020). This acceptance rate is lower than the threshold of 70%, which is necessary to achieve herd immunity (Kreps et al., 2020). Even though this threshold is a minimum number of vaccinated individuals in the population to prevent the virus spread, it is critical to determine the reasons for accepting the vaccination program.

Vaccine safety and efficacy, attitude towards vaccination, previous vaccination status, doctors' recommendation, price, availability, and socio-demographic characteristics are vital factors of COVID-19 vaccination acceptance (Wang et al., 2020). However, there is a lack of information on the multifactor effects on Indonesian vaccination acceptance during this pandemic. Moreover, halal is another crucial issue of concern in Indonesia because most of the population is Muslim and obliged to consume halal products. At the same time, there is a possibility of the existence of impure (*najis*) or prohibited (*haram*) substances in the vaccines (Nedjai, 2021). Therefore, it may lead to labeling the vaccines as haram, thereby contributing to a lower vaccination acceptance rate.

Previous studies have been conducted in several countries to evaluate COVID-19 vaccination acceptance, including Indonesia. Several factors were known as COVID-19 vaccination acceptance predictors in Indonesia, such as demographic status and psychological factors (Yanto et al., 2021), trust in media, and authoritative information (Wirawan et al., 2021), perceived usefulness and perceived religiosity (Faturohman et al., 2021). Besides that, prior immunization status was also correlated with COVID-19 vaccination acceptance (Sidarta et al., 2022). However, very few studies in Indonesia concerned with individuals' COVID-19 vaccination intention using a theoretical and health communication perspective. Since the theory of planned behaviour (TPB) is one of the most common theories used to predict individuals' health behaviours, this research objective was to examine the application of the TPB model to COVID-19 vaccination acceptance. In order to get a better understanding of COVID-19 vaccination acceptance, we used extended-TPB with three additional components (trust, safety, and religious acceptance).

Our work provides several crucial contributions. First, this work deepens insight into the discourse of uptaking vaccination from behavioural focal points. In particular, this study deliberates behavioural factors affecting the decision to accept the COVID-19 vaccination program. In doing so, we modify the TPB as a grand theory to clarify that issue. Referred to Ajzen (1991), the use of TPB usually depends on environmental circumstances. Thus, in terms of uptaking vaccination programs in Indonesia, this research tries to extend the antecedent variables of TPB by adding religious acceptance and safety perception toward vaccination programs as variables. As generally noticed, the two issues, the perception of religious acceptance and the perception of safety toward vaccination programs, were fiercely debated amid campaigning for the uptaking vaccination program in Indonesia. Therefore, the second contribution of this study is amplifying the development of TPB. Third, this work's result can be considered a reference for policymakers to succeed in vaccination programs by paying more attention to the critical role of any significant behavioural variable.

2. Literature Review and Hypotheses Development

2.1 Theory of Planned Behaviour (TPB) and Extended TPB

TPB elucidates human behaviour by postulating that attitude, perceived behavioural control, subjective norms, and intention influence actual human behaviour in decision-making (Ajzen, 1991). Attitude is an evaluative statement

toward an object, such as people, products, and events, while subjective norms are a variable describing how people around us affect our decision-making. Meanwhile, perceived behavioural control is the individual control to perform every activity (Ajzen, 1991). For instance, in terms of the uptaking vaccination program in the condition of pandemic threatening, people probably have higher perceived behavioural control than the uptaking in normal conditions.

According to (Ajzen, 2011), the development of TPB would possibly occur in the future regarding the contextual conditions. Recently, the COVID-19 pandemic has caused numerous societies to be worried, and the vaccination program has become the most logical solution to decrease the spreading of COVID-19. However, not everyone agrees to join the program. According to the Indonesian Ministry of Health and the Central for Disease Control and Prevention (CDC), more than 30% of Indonesian did not assertively refuse the COVID-19 vaccination program. It means specific factors might influence the acceptance of COVID-19 vaccination. Based on this reality, the conventional TPB model would not be sufficient to describe society's behavioural intention toward COVID-19 vaccination program participation. Therefore, to better understand customer intention to uptake the COVID-19 vaccine, we incorporate specific factors (trust, religious acceptance, and safety) related to specific conditions in Indonesia, including Surakarta. We believe that this proposed extended TPB model could better explain the COVID-19 vaccination acceptance in Surakarta than the conventional TPB.

2.2 Attitude, Subjective Norms, and Perceived Behavioural Control

Attitude toward vaccination reflects personal feelings about whether he/she likes or dislikes a COVID-19 vaccine. It describes the individual beliefs in various attributes and benefits of the vaccine. Subjective norms are individual beliefs regarding COVID-19 vaccination built by the expectations of people who are influential on their decisions to take or not a vaccination. Meanwhile, perceived behavioural control (PBC) describes an individual's self-efficacy in the uptaking COVID-19 vaccine. Therefore, if an individual has positive PBC, they will more likely participate in the vaccination program, which means they intend to take the vaccine or be vaccinated. The TPB is currently being applied to predict the COVID-19 vaccination public's acceptance. For example, (Zhang et al., 2021) investigated the behavioural intention among Chinese factory workers to receive a COVID-19 vaccination. The findings showed that attitude, subjective norms, and perceived behavioural control were positively associated with attitude, subjective norms, and perceived behavioural control to receive a vaccine. The ability of this theory to predict health-related behaviour makes its application in this study justifiable, and this led to the formulation of the following hypotheses:

H_1: Attitude towards vaccination program has a positive effect on the intention to take the COVID-19 vaccine

H_2: Subjective norms have a positive effect on the intention to take the COVID-19 vaccine

H_3: Perceived behavioural control has a positive effect on the intention to take the COVID-19 vaccine

2.3 Trust

New components are continuously being added to the success of TPB in predicting behaviour to increase its usefulness and predictive ability, such as novelty-seeking, trust, external influence, situational factors, egoistic, altruism, and concerns towards biospheric (Ibrahim et al., 2020). The dimension of such introduced variable is related to the extent of individuals' belief toward vaccination program effectiveness. In the term of COVID-19 vaccination, individual trust is crucial in the context of vaccination due to several uncertainties regarding the side effects of a vaccine which led to the reluctance of several people to partake in the program (Latkin et al., 2021) and some people have disagreed to accept the vaccine. Several reasons have been associated with refusing COVID-19 vaccines, and lack of trust is among the most important ones (The Ministry of Health et al., 2020). Appropriate knowledge is required to understand vaccines' characteristics properly, but there are false beliefs in public that vaccines might cause dangerous situations for humans (Nihan & Reifler, 2015). Therefore, it indicates that trust is vital in increasing vaccination participation. The term 'trust' used in this study conceptualizes confidence toward the COVID-19 vaccination program, focusing on a person's belief that the program is reliable in stopping the virus's spread. Previous studies proved that trust influenced the customers' intention (Panigrahi et al., 2018)and three TPB main components (attitude, perceived behavioural control, and subjective norms) in purchasing products (Wu & Chen, 2005). Therefore, the following hypotheses were formulated:

H_4: Trust has a significant positive effect on the intention to take the COVID-19 vaccine

H_5: Trust has a significant positive effect on the attitude towards vaccination program

H_6: Trust has a significant positive effect on the subjective norms

H_7: Trust has a significant positive effect on the perceived behavioural control

2.4 Safety and Religious Acceptance

Safety is freedom from danger and risks. It describes the ability of individuals or organizations to deal with risks and hazards to avoid damage or losses and yet still achieve their goals (Reason, 2000). Since trust is expected to play an essential role in the COVID-19 vaccination program, it is vital to analyze the contributors and threats to trust. Karlsson et al. (2021) showed that safety is the most substantial factor of COVID-19 vaccination intention, while Wagner et al.

(2021) discovered it is one of the significant determinants of hesitancy recorded by parents in Shanghai towards childhood vaccination. It indicates that safety might influence trust.

Moreover, the vaccine's preventable ability for some people may appear lower than the risk of vaccination, and they may not be familiar with how the vaccine prevents disease (Ozawa & Stack, 2013). It is related to vaccination safety, one of the most common concerns for the COVID-19 vaccination program (World Health Organization Indonesia, 2020). According to vaccination literature, safety encompasses the vaccine quality, the system used to deliver it, the competence and reliability of health services and health professionals, and the decisions made by policymakers (WHO, 2008). Then, the following hypothesis was formulated:

H_8: Safety has a significant positive effect on trust.

Religious acceptance is the individual perception of the legality of a vaccine considered to their religious' view (Arifin et al., 2022). Religion is another critical factor of people's consideration when making decisions (Muslichah et al., 2019). Moreover, religion affects COVID-19 vaccination, especially in countries with a Muslim majority population, such as Indonesia (Mardian et al., 2021). Besides that, vaccine-preventable cases in Malaysia, Afghanistan, and Pakistan were influenced by the increase in Muslim parents' hesitancy and refusal of childhood vaccination (Ahmed et al., 2018). This issue was due to the halal status of a vaccine associated with the prohibition of using medicine or substances derived from haram sources, such as substances containing pig and its derivates. It includes vaccines designed as the medical product to be injected into the human body to produce antibodies against the targeted virus. A previous study proved that religiosity strongly increased the trust in medical experts (Chu et al., 2021). Moreover, halal vaccine status was one of the major concerns in the COVID-19 vaccination program (Wong et al., 2020), and this concept is related to religious acceptance. Therefore, we propose the following hypothesis:

H_9: Religious acceptance has a significant positive effect on trust

Based on the explanation of such hypothesis constructions, Figure 1 shows the theoretical framework of this study.

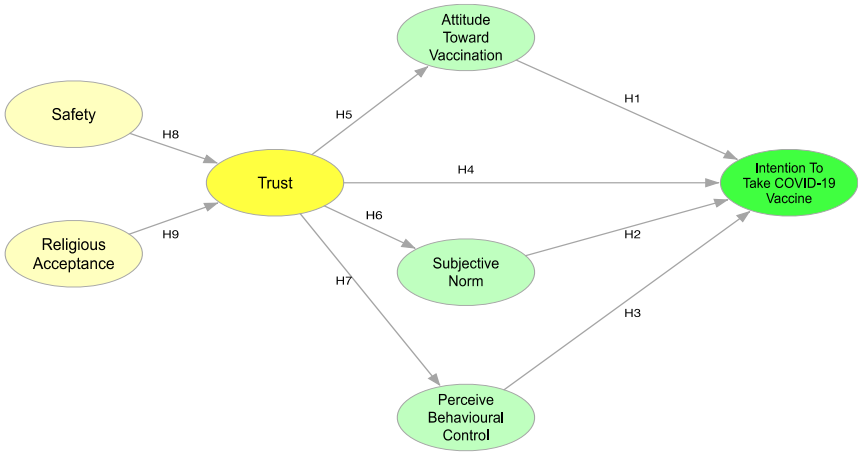

Figure 1. Research Model

3. Method

3.1 Research Approach

This research employed a quantitative approach by applying an online survey for strategic data collection. It involved the design of a questionnaire with 32 closed-end questions to be answered by respondents using a Likert scale ranging from 1 as extremely disagree to 5 as extremely agree. The focus was to obtain primary data on the perception of the people towards the proposed variables, including safety (SF), religious acceptance (RA), trust (TS), attitude towards vaccination (AT), perceived behavioural control (PBC), subjective norms (SN), and the intention towards vaccination (INT).

3.2 Research Sample

This study utilized snowball sampling to determine the research sample with the questionnaires assigned to online groups on social media platforms such as WhatsApp, Facebook, and Telegram. Our sampling goal was to get representative respondents of the Surakarta residence general population based on their age, profession, educational background, and gender. Participants were eligible if they were 18 years old or older and had access to the internet. Technically, we initially hired one person from some groups on social media platforms and then asked them to share the questionnaires through social media platforms with their friends/colleagues. This study involved 222 respondents, consisted of 64% female (n=141) and 36% male (n=81) and the age range include 18-24 (n= 94; 42.34%), 25-34 (n=92; 41.44%), and ≥35 (n=36; 16.21%).

The proposed variables were evaluated using a measurement scale adopted from previous studies (Cadeddu, Daugbjerg, Ricciardi, & 3Rosano, 2020; Choi & Johnson, 2019; Singh, Singh, Kumar, & Mathur, 2021). Choi and Johnson (2019) studied the TPB to explain consumers' intention to purchase green products, and we adopted the instrument of the TPB variables with many changes in the context. For instance, in measuring the attitude variable, Choi and Johnson (2019) proposed, "In the future, for personal use, I like the idea of purchasing green products." In this work, we adjusted such measures became "I have an entirely positive opinion regarding the COVID-19 vaccination program". Afterward, this study further adopted Cadeddu et al. (2020) in measuring the trust variable; for instance, we adjusted the measure of "Vaccines are not harmful and potentially expose to end the disease" to "I believe that the COVID-19 vaccination program is a powerful way to end the pandemic".

3.3 Data Analysis

The measurement scales were first analyzed for validity and reliability. Then, convergent validity analysis was used. Scales are considered valid when the value obtained is higher than 0.5. In contrast, confirmatory factor analysis (CFA) designed by AMOS 22 was applied for reliability, and the scales were considered reliable when the Cronbach-alpha value was higher than 0.6. Moreover, a structural equation model (SEM) by AMOS 22 software was applied to analyze the relationship between the proposed variables. It involved calculating the estimated value (β) and the path coefficients, including t-statistic and *p*-value at >1.5 and <0.05, respectively.

4. Result and Discussion

4.1 Results

Table 1 shows descriptive statistics of the research data as follows. The results showed that religious acceptance, which was used to measure the degree of vaccine acceptance based on halal certification by religious institutions, has the highest mean value. It means there is a significant need for religious ratification of the COVID-19 vaccination program before it is implemented to ensure its success.

Table 1. Descriptive Statistics

	SF	RA	TS	AT	SN	PCB	INT
Mean	3.78	4.36	3.77	3.74	2.87	3.45	3.27
Standard Deviation	0.17	0.00	0.24	0.14	0.46	0.09	0.32
N				222			
SF: Safety	SN: Subjective norms						
RA: Religious Acceptance	PCB: Perceived behavioural control						
TS: Trust	INT: Intention to take the vaccine						
AT: Attitude toward vaccination							

The inter-item consistency, composite reliability (CR), and convergent validity presented in Table 2 showed that the composite reliability of all the items is greater than 0,935 (>.70), which means that all of them exhibit great reliability in measuring the variables. Moreover, the average variance was also observed to be 0,743 (>.50), which means all the items verify the convergent validity of religious acceptance, safety, trust, attitude toward vaccination, perceived behavioural control, subjective norms, and intention toward vaccination. The inter-factor correlation matrix results show a low correlation between the variables, which confirmed the construct's discriminant validity. Therefore, all the items are valid to measure the proposed variables.

The proposed conceptual model was tested using the SEM as previously stated. The goodness of fit (GoF) value showed it is robust, as indicated by the chi-square value of 1511,56 (p<.01), normed-fit index (NFI) of 0.975, standard root mean square residual (SRMR) of 0.078, root mean square error of approximation (RMSEA) of 0.076 and comparative fit index (CFI) of 0.925. Consider the GOF test, which shows $\mathcal{X}^2$ does not fulfill the minimum cut-off (p< .01). The not fulfillment of the chi-square test can be tolerated considering Hair (2009), which argues such $\mathcal{X}^2$ value did not condense the fit quite well. They further stated that the chi-square test is frequently not employed as the only GOF if the measurement bias potentially occurs when research samples become larger. However, the bias issue can be fixed by other measures of GOF, such as RMSEA, SRMR, NFI, and CFI. Consider again to Hair (2009), the model is fit, when the value of those measures are RMSEA = 0.03 to 0.08; SRMR $\leq$ 0.1; NFI = 0 to 1 (the closer to 1, the higher of fit); CFI >0.90. The relationship between variables is, therefore, presented in table 3.

The results showed the perception of safety has positive significant effect on trust (β= 0.71, p<.01, t-statistic= 12.1) while the religious acceptance was interestingly observed not to have any significant effect on trust as indicated by β= 0.004, p=0.947, t-statistic= 0.07. Meanwhile, trust has positive significant effect on attitude towards vaccination (β= 0.88, p<.01, t-statistic= 36.25), subjective norms (β= 0.53, p<.01, t-statistic= 2.05), and perceived behavioural control (β= 0.75, p<.01, t-statistic= 19.92) as expected as well as the intention to take COVID-19 vaccine (β= 0.17, p<.10, t-statistic= 1.85). Furthermore, the attitude towards vaccination (β= 0.23, p<.01, t-statistic= 2.03), subjective norms (β=

0.19, p<.01, t-statistic= 3.8), and perceived behavioural control (β= 0.37, p<.01, t-statistic= 4.19) have positive significant impact on intention to take COVID-19 vaccine.

According to Table 3, the path analysis proved the significant role of TS, ATT, SN, and PBC as mediating variables. TS partially mediated the relationship between SF and three components of TPB variables. It is proved by the decreasing of β in each indirect relationship, for instance, in paths number 1 (direct) and 2 (indirect), which shows the drop of β value of direct relationship (SF to ATT) from 0.71 to 0.18. After that, as previously stated, the three components of TPB were further proved as a significant mediating variable in the relationship between TS and INT, which was statistically proved by the decrease of the β value of the direct relationship value. For instance, the β value of the direct relationship between TS and INT is 0.75; therefore, it declines to 0.57 when SN is introduced as a mediating variable in the model. Referring to Baron and Kenny (1986), the reduction of the estimation coefficient signifies the mediation effect.

Table 2. Item-scale Measurement

Construct & Definition	Items	Item Loading	Cronbach-Alpha	C.R	AVE
Safety (vaccine quality, the system used in delivering it, including the delivery system, competence and reliability of health service and health professionals, and the decisions made by policymakers)	I believe the government guarantee the safety of the vaccination COVID-19 program	0.873	0.914	0.935	0.743
	I am sure that the COVID-19 vaccination program has no negative side effects	0.849			
	I am sure that the COVID-19 vaccination program has standardized work safety equipment to ensure it is successful	0.878			
	I am sure that the COVID-19 vaccination program was preceded by training for the officers	0.837			
	I am sure that the COVID-19 vaccination program has a good risk management practice	0.872			
Religious Acceptance (individual perception toward the legality of vaccine considered to their religious' views)	The COVID-19 vaccination program needs ratification from religious institutions	0.943	0.940	0.958	0.883
	The certainty regarding the halal of the vaccine ingredients is a vital aspect before the COVID-19 vaccination program is implemented	0.936			
	The certainty regarding the halal of the vaccine manufacturing process is a crucial aspect before the COVID-19 vaccination program is implemented	0.940			
Trust (confidence towards the COVID-19 vaccination program itself, focusing on a person's belief that the program is reliable to stop the spread of the virus)	I believe that the COVID-19 vaccination program is a powerful way to end the pandemic	0.809	0.894	0.926	0.759
	I have great expectations of the success of the vaccination program	0.868			
	I believe that the COVID-19 vaccination program will have a significant impact on decreasing the impact of COVID-19	0.900			
	I am sure that the COVID-19 vaccination program will be a success	0.905			
Attitude toward vaccination (expression of personal feelings about whether he/she likes or dislikes a COVID-19 vaccine)	I am sure that vaccination programs are a good idea to cut the spread of COVID-19	0.926	0.900	0.937	0.833
	I am sure that the vaccination program ought to be employed immediately to end the harmful effects of COVID-19	0.922			
	I have an entirely positive opinion regarding the COVID-19 vaccination program	0.890			
Subjective norms (individual belief regarding COVID-19 vaccination built by the expectations of people around who are influential on	I agree with the COVID-19 vaccination program as several people closest to me approved the program.	0.632	0.837	0.891	0.679
	My closest people advised me to participate in the COVID-19 vaccination program	0.920			

his/her decisions to uptake the vaccine)	My closest people have a positive opinion regarding the COVID-19 vaccination program	0.899			
	I agree with the COVID-19 vaccination program based on the fear of being excluded from my social circle	0.630			
Perceived behavioural control (an individual's self-efficacy in the uptaking COVID-19 vaccine)	I am sure I have the financial as well as mental ability to take part in the COVID-19 vaccination program	0.864	0.914	0.932	0.663
	I am incredibly optimistic about my capabilities to participate in the COVID-19 vaccination program	0.872			
	I have all the resources to take part in the COVID-19 vaccination program	0.841			
	I am sure everybody has access to the COVID-19 vaccination program.	0.741			
	There are many opportunities for me to take part in the COVID-19 vaccination program	0.834			
	I am sure that my decision to take the COVID-19 vaccination program is 100% under my control	0.654			
	I am sure that I can take part in the COVID-19 vaccination program anytime and anywhere	0.866			
Intention to take the COVID-19 vaccine (willingness to get vaccinated against a COVID-19 pandemic in a situation where the vaccine is available)	After going through some considerations, I would participate in the COVID-19 vaccination program	0.925	0.918	0.939	0.756
	I am sure that I am ready to participate in the COVID-19 vaccination program	0.917			
	I would continue to participate in the COVID-19 vaccination program even though it is not free	0.753			
	I would make the COVID-19 vaccination program a success through my participation in this program	0.937			
	In essence, I would continue my participation in the COVID-19 vaccination program whatever would happen	0.800			

Table 3. The relationship among variables

Path Analysis	Estimates (β)	t-statistic	p-value	Hypothesis
Safety → Attention toward vaccination	0.71	14.80	0.000	-
Safety → Trust → Attention toward vaccination	0.18	2.62	0.000	-
Safety → Subjective norms	0.50	9.42	0.000	-
Safety → Trust → Subjective norms	0.25	3.35	0.000	
Safety → Perceived behavioural control	0.67	12.87	0.000	-
Safety → Trust →Perceived behavioural control	0.27	3.80	0.000	
Safety → Trust	0.71	12.1	0.000	H8 Accepted
Religious Acceptance → Trust	0.004	0.07	0.947	H9 Rejected
Religious Acceptance → Attention toward vaccination	0.15	1.29	0.197	-
Religious Acceptance → Trust → Attention toward vaccination	-0.01	0.34	0.729	-
Religious Acceptance → Subjective norms	0.18	2.40	0.016	-
Religious Acceptance → Trust → Subjective norms	0.08	1.40	0.160	-
Religious Acceptance → Perceived behavioural control	0.16	1.17	0.239	-
Religious Acceptance → Trust → Perceived behavioural control	-0.01	0.38	0.713	-
Trust → intention to take the COVID-19 vaccine	0.75	24.29	0.000	H4 Accepted
Trust → attitude toward vaccination	0.88	36.25	0.000	H5 Accepted
Trust → attitude toward vaccination → Intention to take COVID-19 vaccine	0.32	3.04	0.000	-
Trust → Subjective norms	0.53	2.05	0.000	H6 Accepted

Trust → Subjective norms → Intention to take COVID-19 vaccine	0.57	12.51	0.000	-
Trust → Perceived behavioural control	0.75	19.92	0.000	H7 Accepted
Trust → Perceived behavioural control → Intention to take COVID-19 vaccine	0.37	4.42	0.000	-
Attitude toward vaccination → Intention to take the COVID-19 vaccine	0.23	2.03	0.043	H1 Accepted
Subjective norms → Intention to take COVID-19 vaccine	0.19	3.80	0.000	H2 Accepted
Perceived behavioural control → Intention to take COVID-19 vaccine	0.37	4.19	0.000	H3 Accepted

4.2 Discussion

This research utilized the extended TPB to evaluate the factors influencing COVID-19 vaccination program intention in Surakarta, Indonesia. The Indonesian Ministry of Health and the Central for Disease Control and Prevention (CDC) data showed that approximately 8% of Indonesians would reject the COVID-19 vaccination. In comparison, 27% hesitated to participate in the programs (Ministry, 2020). It means people who did not accept this vaccination program were primarily due to hesitation and not assertive rejection. Therefore, it is possible to improve acceptance by strengthening the people's intention. Previous research successfully used the same method to predict the intention to accept the Human Papilloma Virus (HPV) vaccine (Li & Li, 2020). The extended TPB factors proposed in this study are religious acceptance, safety, and trust. TPB's three main prediction factors included in this study are the attitude towards vaccination, perceived behavioural control, and subjective norms. The results showed that the TPB successfully described the factors affecting the decision toward COVID-19 vaccination.

Vaccine safety was found to have a significant direct effect on trust towards the success of the COVID-19 vaccination program (H8). Following a previous study on child vaccination, it concluded that vaccine safety is one of the most critical factors affecting parents' intention to participate in childhood immunization programs (Zhou et al., 2018). Another study found that half of China's citizens delayed accepting the COVID-19 vaccine until it was confirmed to be safe (Wang et al., 2020). Moreover, vaccine safety and efficacy significantly affected vaccine hesitancy (Kumar et al., 2016). Therefore, the results of this research confirmed that the vaccine's safety could improve public trust in vaccination programs, which further leads to the intention to accept it. Thus, the government should guarantee vaccine safety, confirm the low side effect, and standardize vaccine service quality.

Religious acceptance is the second factor expected to affect the trust in the COVID-19 vaccine. However, the result showed that religious acceptance did not affect trust (H9). It means people's religious perception in the form of the need to confirm the halal of the vaccine did not affect public trust. However, the descriptive statistics data showed that the religious ratification of the vaccine is the most serious concern among Indonesians. Thus, the government must ensure the halal status in the ingredients or manufacturing process. It is consistent with the previous study on the rotavirus vaccine, which showed that halal certification was required to strengthen community acceptance and trust in their government and leaders (Padmawati et al., 2019). Fortunately, the Indonesian government declared three types of COVID-19 vaccines produced by Sinovac Life Sciences Co.Ltd. China and PT. Biofarma Indonesia have halal certification by Majelis Ulama Indonesia (MUI) and were registered as CoronaVac, Vaksin COVID-19, and Vac2Bio (Dewan Syariah Nasional, 2000).

Trust is the expectation of reliable service from service providers. It reflects people's optimistic acceptance of their vulnerability, believing they can deliver whatever is in their best interest. Therefore, this research proposed hypotheses on the effect of trust on attitude towards vaccination (H5), subjective norms (H6), and perceived behavioural control (H7), and they were all proved. The results were consistent with the findings of a previous study which implied that consumers' trust positively influences people's attitudes towards public services (Ibrahim et al., 2020a). Moreover, trust was found in this study to have a positive effect on subjective norms and perceived behavioural control, and this was observed to be in line with previous findings that trust directly influenced the intention to use public services (Borhan et al., 2017; Giampietri et al., 2018; Madha et al., 2016). It, therefore, means trust has a strong direct positive influence on the three predictors of TPB.

Appropriate strategies to increase people's trust will improve COVID-19 vaccination acceptance in Indonesia. For example, it is possible to adopt the strategy proposed by Gopichandran (2017) to increase public trust primarily by conducting active dialogue through community engagement. It involves establishing a horizontal dialogue with communities while introducing a new vaccine and ensuring adequate accountability with the participants. In addition, people should be given free will to participate in the COVID-19 vaccination program through informed consent.

The results also showed that trust has a positive direct relationship with the intention to participate in vaccination (H4). This empirical evidence quietly sheds insight into the essential role of trust in determining peoples' intention to participate in the COVID-19 vaccination program even though the value is lower than other relationships. However, it is consistent with several previous studies that found trust to be a critical factor affecting the intention to behave. For instance, consumers were observed to make a purchasing decision when they trust a product (Bonsón Ponte et al., 2015; Chinomona et al., 2013; Raharja et al., 2017; Sethna et al., 2017; Weisberg et al., 2011). Therefore, as an official

partner in the forthcoming mass COVID-19 vaccination program, the government must pay more attention to establishing public trust to ensure the successful completion of the program.

Attitude is an evaluation declaration towards an object such as people, product, or event. The results showed that attitude toward vaccination positively impacts the individual intention to participate in the vaccination program (H1). It means a more positive attitude of the people towards the vaccine will lead to a greater intention to participate in the program, and this was observed to be in line with the TPB, which underlines the significant role of attitude in constructing individual intention (Ajzen, 1985, 2011; Ajzen & Driver, 1992). Therefore, successfully implementing the mass COVID-19 vaccination program depends on establishing an individual positive attitude toward vaccination. In addition, the expectancy-value theory states that the underlying factor affecting individual attitude is belief and trust (Osgood et al., 1957). Therefore, there is a need for strategies to raise individuals' positive attitudes towards the program.

Subjective norms involve the important people close to individuals and influencing their decision. The findings showed that this factor positively affects individual intention to participate in the vaccination program (H2). It was further confirmed by several previous scholars that found subjective norms as a pivotal influencing point of individual intention (Ajzen, 1985, 1991; Ajzen & Driver, 1992; Conner & Armitage, 1998; Godin & Kok, 1996; Hsu et al., 2017; Madden et al., 1992; Mohd Suki, 2016; Paul et al., 2016; Yadav & Pathak, 2017). Therefore, the government can use this result to establish an effective strategy to ensure a successful mass vaccination program. Therefore, it is recommended that influencers with several followers and a remarkable ability to convince others are hired to raise society's intention to participate in the program.

PBC was also found to have a significant positive effect on the intention to participate in the vaccination program (H3). PBC verifies the degree of individual self-control in performing certain activities and has been observed to be slightly similar to the concept of self-efficacy introduced by (Bandura, 1986) to measure individuals' perceived confidence in their ability to operate a focal point behaviour.

This study interestingly confirmed that the coefficient estimating the value of PBC to the intention to participate (H3) is greater than the attitude towards vaccination (H1) and subjective norms (H2). It means the critical factor to achieving a successful vaccination program is to create highly individual perceived behavioural control. It was observed to be similar to several studies that indicated PBC has an essential role in establishing individual intention.

5. Conclusion

The findings showed trust to be a critical factor influencing the intention to take the COVID-19 vaccine. Besides that, trust has also been significantly proved to be a key antecedent variable affecting the attitude towards vaccination, perceived behavioural control, and subjective norms. Meanwhile, trust was also observed to be strongly influenced by safety, which means the best way to build trust in people is by confirming and publishing information on the vaccine's safety. Moreover, perceived behavioural control, subjective norms, and attitude towards vaccination were discovered to have a moderate impact on intention, which is another possible method to implement the vaccination program successfully. Therefore, it was generally recommended that the government pay more attention to establishing public trust, hire an influencer to raise society's intention to participate, and create high individual perceived behavioural control in the vaccination program. The limitation of this study was that the extended-TPB model was designed based on the consideration of actual specific conditions in Indonesia. Therefore, each country's condition must be reviewed before using this extended-TPB model for future research for different countries.

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Author Contribution

Author 1: conceptualization, writing original draft, data curation, formal analysis, investigation, methodology. Author 2: conceptualization, writing original draft, validation, review and editing, investigation, methodology

Conflict of Interest

The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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