Factors Affecting Perceived Effectiveness of Government Response towards COVID-19 Vaccination in Occidental Mindoro, Philippines

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Abstract: The COVID-19 pandemic has caused several developing countries to fall behind on vaccination at the onset of the pandemic, thus affecting the mobility of easing restrictions and lowering virus transmission. The current study integrated the Protection Motivation Theory (PMT) and extended the Theory of Planned Behavior (TPB) to evaluate factors affecting the perceived effectiveness of government response towards COVID-19 vaccination in Occidental Mindoro. A total of 400 respondents from the municipalities of Occidental Mindoro answered the online questionnaires, which contained 61 questions. This study outlined the relationship between the dependent and independent variables using structural equation modeling (SEM). The results indicated that knowledge of COVID-19 vaccination had significant direct effects on its perceived severity. Subjective standards had significant adverse effects on willingness to follow. In addition, perceived behavioral control was discovered to impact willingness to follow positively. It also showed that perceived government response was significantly affected by adaptive behavior and actual behavior regarding the perceived government response. Meanwhile, it was found that the perceived government response had significant effects on perceived effectiveness. The current study is one of the first to study the factors that affect the perceived effectiveness of government response toward COVID-19 vaccination.

Keywords: COVID-19; vaccination; perceived effectiveness; government response

1. Introduction

COVID-19 first appeared in Wuhan, China, in December 2019, and was declared as a “pandemic” on 11 March 2020. The Philippines is one of the Western Pacific countries most badly hit by COVID-19. The first case of COVID-19 was confirmed by the Philippine Department of Health (DOH) on 20 January 2020 [1,2]. Since then, more than 180 million cases have been recorded worldwide and around 3 million deaths as of 6 July 2021 [3]. The Philippines recorded around 2.8 million cases and more than 51,000 deaths as of December 2021 and remains one of the most affected countries in the Western Pacific region [4]. Moreover, healthcare systems have been disrupted throughout the pandemic due to emerging COVID-19 variants such as delta and omicron due to the easing of restrictions and the lagging of vaccination.

The lagging of vaccination in the country affects the mobility of easing restrictions and lowering virus transmission. The Philippines administered more than 60 million first doses and over 46 million second doses, with 104 million doses of COVID-19 vaccines as of December 2021 [5]. The Philippine government is still far from reaching the herd immunity rate of 60% to 70% of the total population. One possible reason is the current perception...
of the effectiveness of the vaccine. Similarly, in the US, a significant number of the population (25 to 35%) question the safety and effectiveness of the COVID-19 vaccines [6,7]. Several researchers have studied the effects of COVID-19 on emotion, education, response, transportation, and economy [8–12]; however, a limited study investigated the perceived effectiveness of the government response toward COVID-19 vaccination. The study investigated the factors that affect the perceived effectiveness of government response towards COVID-19 vaccination at Occidental Mindoro, Philippines, applying the Theory of Planned Behavior (TPB) and the Protection Motivation Theory (PMT). The study might be one of the first to analyze the perceived effectiveness of government response to COVID-19 vaccinations and to possibly provide the information to the government agencies in enhancing public trust in their government response to COVID-19 vaccinations.

Theoretical Framework

The study proposed 13 hypotheses, as shown in the hypothesized SEM model (Figure 1), which served as the study’s theoretical research framework. We used the PMT and TPB to investigate the causal relationships between identified factors and latent variables, unlike a prior study that solely used PMT linked to COVID-19 [13]. Similarly to Yogi et al. (2020), the current study integrated the PMT and TPB in evaluating the factors affecting the perceived effectiveness of the government response towards COVID-19 vaccination in Occidental Mindoro, Philippines [14].

The Protection Motivation Theory occurs when a person is mainly driven to undertake a defensive action due to an unexpected event [15]. Perceived vulnerability, also called

Figure 1. Initial SEM with indicators for evaluating factors affecting the perceived effectiveness of government response towards COVID-19 vaccination in Occidental Mindoro.
perceived probability, indicates a person’s assumptions about the possibility of a health risk or the probability of having a disease. Weinstein (2000) indicated that people progress to various phases in understanding their vulnerability. It commonly starts from being unaware to having awareness and finally recognizing the risk they might experience. Awareness is a critical factor in preventing any harm from happening. It might benefit individuals in understanding certain events; thus, it prohibits the occurrence of the risk [16]. Thus, the researchers hypothesized the following:

Hypothesis (H1). There is a significant relationship between knowledge of COVID-19 vaccination and perceived vulnerability.

Hypothesis (H2). There is a significant relationship between knowledge of COVID-19 vaccination and perceived severity.

Individuals with varying global and personal perceptions (severity and vulnerability) of COVID-19 may exhibit varying behavioral responses to COVID-19. According to several studies on perceived vulnerability and severity, the disease appears to promote engagement and compliance with COVID-19 preventative behavior [17–19]. Thus, the researchers hypothesized the following:

Hypothesis (H3). There is a significant relationship between perceived vulnerability and perceived behavioral control.

Hypothesis (H4). There is a significant relationship between perceived severity and perceived behavioral control.

In accordance with the Theory of Planned Behavior, a person’s beliefs about whether or not other people should engage in a behavior determine whether they should engage in it. An individual’s emotions become intense when he or she is close to being unwell (HBM). People typically consider the medical and social consequences when measuring severity. It does not address environmental or economic factors that could influence a person’s decision to engage in a behavior and whether to prohibit or promote it [20]. Thus, the researchers hypothesized the following:

Hypothesis (H5). There is a significant relationship between perceived vulnerability and subjective standard.

Hypothesis (H6). There is a significant relationship between perceived severity and subjective standard.

Perceived behavioral control has a correlation to the factors derived from the theory of planned behavior [21]. Self-efficacy is a component shared by TPB and PMT; both theories have a similar notion of perceived behavioral control [22]. It emphasizes a person’s skills and competencies in handling a task or planning [23]. Moreover, it also exhibits that self-efficacy considerably influences a person’s capability in performing task behavior [24]. Therefore, the researchers hypothesized that:

Hypothesis (H7). There is a significant relationship between perceived behavioral control and willingness to follow.

According to Fan et al. (2021), the subjective norm of COVID-19 vaccination is how an individual perceives others’ opinions toward COVID-19 vaccination [25]. Past research indicated that there is a significant relationship between subjective standards and organizational conformity [26–28]. In contrast, Armitage and Conner (2001) indicated that
subjective standards commonly show a poor indicator of behavioral intentions due to personal perception and environmental factors [29]. Hence, we hypothesized that:

**Hypothesis (H8).** There is a significant relationship between subjective standards and willingness to follow.

As stated in the TPB, the prototype willingness model is a systematic process that influences achieving behavioral indication. Behavior is susceptible to instantaneous changes in the environment, is impulsive, and is significantly affected by the perception of likelihood of a behavioral model, whereas when individuals find themselves in situations that encourage certain behaviors, especially risk-taking behaviors such as smoking, it is not their preconceived intentions that determine their actions but their eagerness to associate with the behaviors such as an interest in an opportunity. The extent to which individuals regard themselves as similar to the prototype person who engages in the actions in question determines their willingness [30]. Thus, the researchers hypothesized the following:

**Hypothesis (H9).** There is a significant relationship between willingness to follow and adaptive behavior.

**Hypothesis (H10).** There is a significant relationship between willingness to follow and actual behavior.

COVID-19 was one of the most challenging crises the world has faced in the last century. The Philippines had the world’s longest lockdown, in which entire provinces and cities were placed under lockdown, transportation was prohibited, and masks and social distance were rigidly enforced. Punitive action was taken in response to violations. Maintaining order and adhering to all health procedures are the responsibility of the police and military. The government’s response has been labeled as “draconian”, “militarized”, or “police-centric” by some observers and academicians [29]. According to Owens (2000), even though people are aware of the situation and desire to help, they may see their actions as insignificant on a bigger scale. As a result, in addition to retaining prosocial beliefs, socially responsible behavior requires the belief that one’s activities will have an impact [30]. Thus, the researchers hypothesized the following:

**Hypothesis (H11).** There is a significant relationship between actual behavior and perceived government response.

**Hypothesis (H12).** There is a significant relationship between adaptive behavior and perceived government response.

**Hypothesis (H13).** There is a significant relationship between government response and perceived effectiveness.

2. Methodology

2.1. Participants

The study utilized a cross-sectional design due to the social distancing measures and restricted movement and lockdowns; data were collected online, using Google Forms [14]. A link to the survey was distributed to participants through Messenger from 2 October to 30 November 2021. Informed consent was obtained from all subjects involved in the study before conducting the survey. The total population of 11 municipalities in the province of Occidental Mindoro is 525,354 [31]. To determine the sample size and the representativeness of the population, convenience sampling was used and Slovin’s formula was utilized. A total of 400 respondents from the different municipalities of Occidental Mindoro between 18 to 70 years old answered the online questionnaire, which contained 61 questions.
The result of the questionnaire showed that, among the 400 participants, 56.8% were female and 43.2% were male. About 80.5% were between 18–29 years of age, 6.3% were between 30–39, 6.8% were between 40 and 49 years, 5.2% were between 50–59, 1% were between 60–69, and 0.2% were 70 and above. Approximately 2.5% of the respondents were elementary graduates, 10.5% were high school graduates, 42% were senior high school graduates, 5.8% were technical/vocational graduates, 29.8% were baccalaureate/college graduates, 4% were post-baccalaureate graduates, 3.5% were special education undergraduate graduates, 0.7% were special education graduates, and 1.2% were no grade completed. In addition, most of the participants were from the municipalities of San Jose with 35.2%, Rizal with 12.5%, Magsaysay with 12.5%, Sta. Cruz with 9.2%, Sablayan with 6.2%, Looc with 4.8%, Abra de Ilog with 4.5%, Paluan with 3.7%, Mamburao with also 3.7%, Lubang with 4%, and, lastly, Calintaan with 3.5%. Additionally, most have a monthly salary/allowance of less than PHP 15,000 (77.3%). About 16% of the respondents have a monthly salary/allowance of PHP 15,000–PHP 30,000, 5% of them have a monthly salary/allowance of PHP 30,000–PHP 45,000, 1% of them have a salary of PHP 45,001–PHP 60,000, and 0.7% have a salary of PHP 60,001–PHP 75,000, as shown in Table 1.

Table 1. Demographic summary of the participants \( (n = 400) \).

| Characteristics            | Category                  | \( n \) | %   |
|----------------------------|----------------------------|---------|-----|
| Gender                     | Male                       | 173     | 43.2%|
|                            | Female                     | 227     | 56.8%|
| Age                        | 18–29                      | 322     | 80.5%|
|                            | 30–39                      | 25      | 6.3% |
|                            | 40–49                      | 27      | 6.8% |
|                            | 50–59                      | 21      | 5.2% |
|                            | 60–69                      | 4       | 1%   |
|                            | 70 and over                | 1       | 0.2% |
| Educational Background     | Elementary graduate        | 10      | 2.5% |
|                            | High School graduate       | 42      | 10.5%|
|                            | Senior High School graduate| 168     | 42%  |
|                            | Technical-Vocational graduate| 23   | 5.8% |
|                            | Baccalaureate/College graduate| 119 | 29.8%|
|                            | Post-Baccalaureate graduate| 16      | 4%   |
|                            | No grade completed         | 5       | 1.2% |
|                            | Special Education (undergraduate) | 14     | 3.5% |
|                            | Special Education (graduate) | 3    | 0.7% |
| Municipality               | Abra de Ilog               | 18      | 4.5% |
|                            | Calintaan                  | 14      | 3.5% |
|                            | Looc                       | 19      | 4.8% |
|                            | Lubang                     | 16      | 4%   |
|                            | Magsaysay                  | 50      | 12.5%|
|                            | Mamburao                   | 15      | 3.7% |
|                            | Paluan                     | 15      | 3.7% |
|                            | Rizal                      | 50      | 12.5%|
|                            | Sablayan                   | 25      | 6.2% |
|                            | San Jose                   | 141     | 35.2%|
|                            | Sta. Cruz                  | 37      | 9.2% |
Table 1. Cont.

| Characteristics | Category            | n   | %   |
|-----------------|---------------------|-----|-----|
| Monthly salary  | Less than PHP 15,000| 311 | 77.3%|
|                 | PHP 15,001–30,000   | 64  | 16% |
|                 | PHP 30,001–45,000   | 20  | 5%  |
|                 | PHP 45,001–60,000   | 4   | 1%  |
|                 | PHP 60,001–75,000   | 1   | 0.7%|
|                 | PHP above 75,000    | 0   | 0%  |

2.2. Questionnaire

A self-administered questionnaire from different related studies was developed to evaluate the factors affecting the perceived effectiveness of government response towards COVID-19 vaccination in Occidental Mindoro. The questionnaire consisted of 61 questions with 11 sections: (1) demographic profile (gender, age, educational background, municipality, monthly salary, and health insurance; it was required to determine if the subjects in the given research constituted a representative sample of the target population, for much better results for this study); (2) knowledge of COVID-19 vaccination; (3) perceived vulnerability to disease; (4) perceived severity to disease; (5) perceptions towards government response; (6) subjective standard; (7) perceived behavioral control; (8) willingness to follow; (9) actual behavior; (10) adapted behavior; and (11) perceived effectiveness. Each question was constructed to achieve the objective of the study. Every question in each section would help this study identify the problem’s fundamental cause and devise a solution that considers everyone’s perception.

2.3. Statistical Analysis: Structural Equation Modeling

Structural equation modeling (SEM) is a statistical model that employs several statistical techniques that include analysis of variance, analysis of covariance, multiple regression, factor analysis, and path analysis. SEM is also known as covariance structural analysis, equation system analysis, and analysis of moment structure [32]. Some of the popular software packages for SEM include AMOS, LISREL, and EQS; in the current study, the proposed model was obtained using AMOS 22 (New York, USA) with a maximum likelihood estimation approach. The maximum likelihood approach estimates the theoretical model parameters simultaneously to develop a full estimation model [33].

The current study utilized four sets of tests that consisted of a full model fit, goodness-of-fit indexes, an incremental model fit, and the badness-of-fit indexes to evaluate the variation between the hypothesized model and observed data. For the full model test, the $p$-value should be greater than 0.05 with a normed chi-square ($\chi^2$/df) value of less than 2.0; it implies no significant difference between the observed sample and SEM estimated covariance matrices. The fundamental factor in assessing the goodness-of-fit (GOF) index of the SEM model is identifying the difference in the covariance matrices [34]. Moreover, GOF, which acts as the $R^2$ in linear regression analysis, utilized the goodness-of-fit index (GFI) and adjusted goodness-of-fit index (AGFI) with the values of 0.95 and 0.90 for GFI and AGFI, respectively, which were classified as well-fitting results [35]. The incremental fit index was determined through the comparative fit index (CFI), Tucker–Lewis index (TLI), and normed fit index (NFI); a good model fit has a value greater than 0.95 for all three incremental fit index measures. Lastly, root mean square error (RMSEA) was used to evaluate the badness-of-fit index. An RMSEA value smaller than 0.07 was considered a good fit result [36].

3. Results

Table 2 shows the summary of the questionnaire based on the different related literature. Knowledge of COVID-19 vaccination, perceived vulnerability to disease, perceived severity to disease, perception towards government response, perceived behavioral control, willingness to follow, actual behavior, adapted behavior, and perceived effectiveness had
6 questions each while the subjective standards had 7 questions, with a total of 61 questions.

### Table 2. The constructs and measurement item.

| Construct | Items | Measures | Supporting Measures |
|-----------|-------|----------|---------------------|
| Knowledge of COVID-19 Vaccination | KV1 | I think it is legally mandatory to take COVID-19 vaccines. | Kumari et al. (2021) [37] |
| | KV2 | COVID-19 vaccination may protect other people who do not receive the vaccine. | Mohamed et al. (2021) [38] |
| | KV3 | I think the COVID-19 vaccine will be useful in protecting me from COVID-19 infection. | Kumari et al. (2021) [37] |
| | KV4 | I think COVID-19 vaccines are essential for us. | Islam et al. (2021) [39] |
| | KV5 | I think COVID-19 vaccines use genetic material from coronavirus as the active ingredients. | Mohamed et al. (2021) [38] |
| | KV6 | I think COVID-19 vaccines have health-related risk. | Alqudeimat et al. (2021) [40] |
| Perceived Vulnerability to Disease | PV1 | I think I am highly susceptible to COVID-19. | Diaz et al. (2016) [41] |
| | PV2 | I think there is a possibility that my family will be infected with COVID-19. | Nicola et al. (2020) [42]; Coccia (2020) [43] |
| | PV3 | I have a history of infectious illness vulnerability. | Diaz et al. (2016) [41] |
| | PV4 | I think I am more prone to become ill when my friends are ill. | Diaz et al. (2016) [41] |
| | PV5 | I think COVID-19 is a major threat in my community. | Coccia (2020) [43] |
| | PV6 | I think I am vulnerable to COVID-19 because of my job. | Bavel et al. (2020) [44] |
| Perceived Severity to Disease | PS1 | The thought of COVID-19 gives me a negative emotion (e.g., worries, fears, and anger) | Li et al. (2020) [17] |
| | PS2 | Contracting COVID-19 would be very serious. | Yıldırım and Güler (2020) [45] |
| | PS3 | Thinking that I am exposed or at risk of getting COVID-19 threatens me. | Yıldırım and Güler (2020) [45] |
| | PS4 | Contracting COVID-19 would greatly endanger my financial stability. | Shauly et al. (2020) [46] |
| | PS5 | I believe that COVID-19 brings severe health problems. | Luo et al. (2021) [47] |
| | PS6 | Contracting COVID-19 would threaten my family. | Stephenson et al. (2020) [48] |
| Perception towards Government Response | PG1 | The government proactively released timely information about vaccination. | OECD (2021) [49] |
| | PG2 | The government communicated clearly to ensure that everyone had the information they needed for the COVID-19 vaccination, regardless of socioeconomic level, migrant status, ethnicity, or language. | Lazarus et al. (2020) [50] |
| | PG3 | The government promotes confidence in the effectiveness and safety of the vaccine. | OECD (2021) [49] |
| | PG4 | The government had a strong COVID-19 vaccination preparedness team that included public health and medical team. | Lazarus et al. (2020) [50] |
| | PG5 | The government made sure we always had full access to the healthcare services we needed during the COVID-19 vaccination. | Lazarus et al. (2020) [50] |
| | PG6 | The government made certain that healthcare personnel always had the personal equipment they required to avoid contracting COVID-19. | World Health Organization (2021) [51] |
| Construct          | Items                                                                 | Measures                                                                 | Supporting Measures                                      |
|--------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------|
| **Subjective Standards** | Most people I know are following the preventive protocols given by the government. | ss1                                                                        | Centers for Disease Control and Prevention (2020) [52]   |
|                    | Most people I know are wearing face masks outside.                     | ss2                                                                        | [53]                                                     |
|                    | Most people I know are wearing face shields at enclosed public spaces (such as commercial establishments). | ss3                                                                        | [54]                                                     |
|                    | Most people I know are staying at home and/or work from home.          | ss4                                                                        | Barbour et al. (2021) [55]                               |
|                    | Most people I know are using hand sanitizer.                           | ss5                                                                        | Mahmood et al. (2020) [56]                               |
|                    | Most people I know are doing physical distancing.                      | ss6                                                                        | Guo et al. (2021) [57]                                   |
|                    | Most people I know are vaccinated (either once or twice).              | ss7                                                                        | Fadda et al. (2021) [58]                                 |
| **Perceived Behavioral Control** | I am aware of the facts about COVID-19 vaccines and do not believe in fake news spreading in social media. | pbc1                                                                       | Zhang et al. (2021) [59]                                  |
|                    | Availability of vaccines with higher efficacy rate against COVID-19 pushed me to get vaccinated. | pbc2                                                                       | [59]                                                     |
|                    | It is mostly up to me if I get COVID-19 vaccine or not.               | pbc3                                                                       | [59]                                                     |
|                    | If I wanted to, I could easily have COVID-19 vaccination.              | pbc4                                                                       | [59]                                                     |
|                    | I believe in the effectiveness of the vaccine given by the government because it has been proven safe and effective. | pbc5                                                                       | Yahaghi et al. (2021) [60]                               |
|                    | The availability of the vaccine here in Occidental Mindoro will push me to get vaccinated. | PCB6                                                                       | [60]                                                     |
| **Willingness to Follow** | I am willing to trust in the ability of governments to communicate about vaccination. | wf1                                                                        | El-Elimat et al. (2021) [61]                             |
|                    | I am willing to be vaccinated.                                          | wf2                                                                        | Guidry et al. (2021) [62]                                 |
|                    | I am willing to follow the safety signal and the different responses of regulators. | wf3                                                                        | Bish et al. (2011) [63]                                  |
|                    | I am willing to coordinate with government policies during COVID-19 vaccination. | wf4                                                                        | van der Bles et al. (2021) [64]                          |
|                    | I am willing to be vaccinated in any available vaccines in our municipality. | wf5                                                                        | [64]                                                     |
|                    | I am willing to wait for my turn to be vaccinated.                     | wf6                                                                        | Wang et al. (2021) [65]                                  |
| **Actual Behavior** | Majority of the people are getting vaccinated.                          | ab1                                                                        | Reiter et al. (2021) [66]                                 |
|                    | COVID-19 vaccination is near in my area.                               | ab2                                                                        | [66]                                                     |
|                    | The company/school where I work/study implements work from home to prevent the spread of COVID-19. | ab3                                                                        | Chi et al. (2021) [67]                                   |
|                    | COVID-19 vaccine has no payment.                                       | ab4                                                                        | Kitro et al. (2021) [68]                                 |
|                    | I am practicing social distancing to prevent the risk of spreading the virus. | ab5                                                                        | Wu and Mcgoogan (2020) [69]                              |
|                    | I always wear face mask whenever I go.                                 | ab6                                                                        | Shaw et al. (2020) [70]                                  |
Table 2. Cont.

| Construct                  | Items                                      | Measures                                                                                                         | Supporting Measures |
|----------------------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------|
| Adapted Behavior           | AD1 I will wait for others to be vaccinated. | Cerda and Garcia (2021) [71]                                                                                     |                     |
|                            | AD2 I do not get vaccinated because of fear of needles. | Alle and Oumer (2021) [72]                                                                                       |                     |
|                            | AD3 I was worried about side effects of COVID-19 vaccine. | Reno et al. (2021) [73]                                                                                         |                     |
|                            | AD4 I am worried about the rapidity of the development of the COVID vaccine. | Alle and Oumer (2021) [72]                                                                                       |                     |
|                            | AD5 I think vaccine will be ineffective.      | Cerda and Garcia (2021) [71]                                                                                     |                     |
|                            | AD6 I think the COVID-19 vaccine was not safe. | Reno et al. (2021) [73]                                                                                         |                     |
| Perceived Effectiveness    | PE1 I think vaccine prevents me from being infected. | Mohamed et al. (2021) [38]                                                                                      |                     |
|                            | PE2 I think I can lead a normal life after I get vaccinated. | Mohamed et al. (2021) [38]                                                                                      |                     |
|                            | PE3 I think vaccination decreases my chance of getting COVID-19 or its effects. | Lin et al. (2020) [74]                                                                                         |                     |
|                            | PE4 I think vaccines mimic the virus or bacterium that causes illness and cause the body to produce antibodies in response. | Khorramdelazad et al. (2021) [75]                                                                               |                     |
|                            | PE5 I think COVID-19 vaccines vary as does the way they stimulate the immune system to produce antibodies. | Romero-Alvarez et al. (2021) [76]                                                                               |                     |
|                            | PE6 I think my age gives an impact on how I react to the COVID-19 vaccine’s negative effects. | Djanas et al. (2021) [77]                                                                                      |                     |

Figure 1 demonstrates the initial SEM for evaluating factors affecting the perceived effectiveness of government response towards COVID-19 vaccination in Occidental Mindoro. According to the figure, two hypotheses did not have a significant relationship:

- Hypothesis 3: Perceived behavioral control to perceived vulnerability ($p = 0.76$);
- Hypothesis 5: Perceived vulnerability to subjective standard ($p = 0.216$).

In addition, 11 hypotheses had a significant relationship, as follows:

- Hypothesis 1: Knowledge of COVID-19 vaccination and perceived vulnerability ($p = 0.001$);
- Hypothesis 2: Knowledge of COVID-19 vaccination and perceived severity ($p = 0.002$);
- Hypothesis 4: Perceived severity and perceived behavioral control ($p = 0.001$);
- Hypothesis 6: Perceived severity and subjective standard ($p = 0.002$);
- Hypothesis 7: Perceived behavioral control and willingness to follow ($p = 0.003$);
- Hypothesis 8: Subjective standards and willingness to follow ($p = 0.002$);
- Hypothesis 9: Willingness to follow and adaptive behavior ($p = 0.001$);
- Hypothesis 10: Willingness to follow and actual behavior ($p = 0.003$);
- Hypothesis 11: Actual behavior and perceived government response ($p = 0.002$);
- Hypothesis 12: Adaptive behavior and perceived government response ($p = 0.025$);
- Hypothesis 13: Government response and perceived effectiveness ($p = 0.002$).

A revised SEM was derived by removing the two latent variables that did not have a significant relationship from the initial SEM. Figure 2 shows the final SEM for the perceived effectiveness of government response towards COVID-19 vaccination in Occidental Mindoro. The proponents modified some indices to enhance the model fit based on previous studies that used the SEM approach [14].

Table 3 shows the descriptive statistic results of each indicator. The values of the CFI, IFI, and TLI were all better than the suggested value of 0.80, which signifies that the model accurately represented the observed data. Additionally, the computed GFI and AGFI values were 0.828 and 0.801, which means that the model fit was good. The computed value of RMSEA was 0.042, which was also lower than the recommended value.
Figure 2. The final SEM for evaluating the perceived effectiveness of government response towards COVID-19 vaccination in Occidental Mindoro.
Table 3. Descriptive statistics result.

| Variable                        | Item  | Mean  | Std   | Factor Loading |
|---------------------------------|-------|-------|-------|----------------|
|                                 |       |       |       | Initial | Final |
| Knowledge of COVID-19 Vaccination | KV1   | 3.74  | 1.164 | 0.572   | 0.654 |
|                                 | KV2   | 3.43  | 1.234 | 0.460   | 0.570 |
|                                 | KV3   | 4.11  | 0.899 | 0.800   | 0.897 |
|                                 | KV4   | 4.13  | 0.915 | 0.834   | 0.967 |
|                                 | KV5   | 3.91  | 0.943 | 0.500   | 0.568 |
| Perceived Severity              | PS1   | 3.93  | 1.042 | 0.610   | 0.689 |
|                                 | PS2   | 4.25  | 0.829 | 0.790   | 0.836 |
|                                 | PS3   | 4.01  | 0.950 | 0.756   | 0.823 |
|                                 | PS4   | 4.05  | 0.946 | 0.661   | 0.686 |
|                                 | PS5   | 4.31  | 0.902 | 0.742   | 0.987 |
|                                 | PS6   | 4.25  | 0.884 | 0.807   | 0.882 |
| Perceived Behavioral Control    | PBC1  | 4.14  | 0.888 | 0.812   | 0.891 |
|                                 | PBC2  | 3.98  | 0.940 | 0.810   | 0.867 |
|                                 | PBC3  | 4.21  | 0.918 | 0.610   | 0.811 |
|                                 | PBC4  | 3.96  | 1.017 | 0.532   | 0.591 |
|                                 | PBC5  | 3.92  | 0.952 | 0.764   | 0.834 |
|                                 | PBC6  | 3.90  | 1.021 | 0.783   | 0.791 |
| Subjective Standards            | SS1   | 3.70  | 1.003 | 0.716   | 0.776 |
|                                 | SS2   | 4.13  | 0.930 | 0.704   | 0.765 |
|                                 | SS3   | 3.73  | 1.045 | 0.787   | 0.834 |
|                                 | SS4   | 3.79  | 1.002 | 0.748   | 0.791 |
|                                 | SS5   | 3.97  | 0.957 | 0.736   | 0.846 |
|                                 | SS6   | 3.51  | 1.115 | 0.729   | 0.818 |
|                                 | SS7   | 3.84  | 1.002 | 0.612   | 0.678 |
| Willingness to Follow           | WF1   | 3.92  | 0.899 | 0.857   | 0.783 |
|                                 | WF2   | 4.20  | 1.010 | 0.744   | 0.942 |
|                                 | WF3   | 4.34  | 0.856 | 0.838   | 0.882 |
|                                 | WF4   | 4.34  | 0.883 | 0.813   | 0.707 |
|                                 | WF5   | 4.03  | 1.047 | 0.860   | 0.742 |
|                                 | WF6   | 4.24  | 0.935 | 0.728   | 0.765 |
| Adaptive Behavior               | AD1   | 3.21  | 1.187 | 0.353   | -     |
|                                 | AD2   | 2.34  | 1.421 | 0.637   | 0.729 |
|                                 | AD3   | 3.57  | 1.241 | 0.607   | 0.735 |
|                                 | AD4   | 3.53  | 1.139 | 0.590   | 0.779 |
|                                 | AD5   | 2.71  | 1.225 | 0.897   | 0.642 |
|                                 | AD6   | 2.64  | 1.249 | 0.872   | 0.747 |
| Actual Behavior                 | AB1   | 3.98  | 0.870 | 0.627   | 0.739 |
|                                 | AB2   | 3.87  | 1.094 | 0.567   | 0.965 |
|                                 | AB3   | 4.10  | 0.941 | 0.568   | 0.918 |
|                                 | AB4   | 4.51  | 0.795 | 0.653   | 0.648 |
|                                 | AB5   | 4.30  | 0.879 | 0.681   | 0.664 |
|                                 | AB6   | 4.58  | 0.721 | 0.719   | 0.728 |
| Perceived Government Response   | PGR1  | 3.88  | 0.895 | 0.765   | 0.882 |
|                                 | PGR2  | 3.82  | 0.945 | 0.769   | 0.904 |
|                                 | PGR3  | 3.89  | 0.923 | 0.761   | 0.841 |
|                                 | PGR4  | 3.67  | 0.988 | 0.793   | 0.771 |
|                                 | PGR5  | 3.63  | 0.990 | 0.817   | 0.799 |
|                                 | PGR6  | 3.76  | 0.937 | 0.799   | 0.862 |
| Perceived Effectiveness         | PE1   | 3.72  | 1.054 | 0.681   | 0.743 |
|                                 | PE2   | 3.62  | 0.999 | 0.669   | 0.858 |
|                                 | PE3   | 3.90  | 0.945 | 0.770   | 0.802 |
|                                 | PE4   | 3.85  | 0.922 | 0.786   | 0.748 |
|                                 | PE5   | 3.97  | 0.843 | 0.769   | 0.848 |
|                                 | PE6   | 3.94  | 0.922 | 0.605   | 0.780 |
Table 3. Cont.

| Variable          | Item | Mean | Std   | Factor Loading |
|-------------------|------|------|-------|----------------|
|                   |      |      |       | Initial | Final |
| Perceived Vulnerability | PV1  | 3.19 | 1.179 | 0.784   | -     |
|                   | PV2  | 3.46 | 1.284 | 0.761   | -     |
|                   | PV3  | 2.23 | 1.330 | 0.637   | -     |
|                   | PV4  | 2.99 | 1.324 | 0.750   | -     |
|                   | PV5  | 4.11 | 1.165 | 0.430   | -     |
|                   | PV6  | 2.93 | 1.372 | 0.670   | -     |

Table 4 shows the Cronbach’s alpha of nine latent variables was greater than 0.7, their average variance extracted was all greater than 0.5 and their composite reliability was also greater than 0.7.

Table 4. Construct validity model.

| Factor                                | Cronbach’s α | Average Variance Extracted (AVE) | Composite Reliability (CR) |
|---------------------------------------|--------------|----------------------------------|-----------------------------|
| Knowledge of COVID-19 Vaccination     | 0.754        | 0.563                            | 0.860                       |
| Perceived Severity                   | 0.871        | 0.680                            | 0.930                       |
| Perceived Behavioral Control         | 0.865        | 0.646                            | 0.915                       |
| Subjective Standards                 | 0.882        | 0.622                            | 0.920                       |
| Willingness to Follow                | 0.922        | 0.652                            | 0.918                       |
| Adaptive Behavior                    | 0.848        | 0.530                            | 0.849                       |
| Actual Behavior                      | 0.803        | 0.620                            | 0.905                       |
| Perceived Government Response        | 0.907        | 0.713                            | 0.937                       |
| Perceived Effectiveness              | 0.859        | 0.636                            | 0.913                       |

Table 5 shows that the five parameters, namely, incremental fit index, Tucker–Lewis index, comparative fit index, goodness-of-fit index, and adjusted goodness-of-fit index, were all acceptable with parameter estimates greater than 0.8, whereas mean square error was excellent with parameter estimates less than 0.07. The RMSEA value was 0.042, lower than the recommended value. Finally, the direct, indirect, and total effects are presented in Table 6.

Table 5. Model fit.

| Good-of-Fit Measures of SEM | Parameter Estimates | Minimum Cutoff | Interpretation |
|-----------------------------|---------------------|----------------|----------------|
| Incremental Fit Index (IFI) | 0.932               | >0.8           | Acceptable     |
| Tucker–Lewis Index (TLI)    | 0.923               | >0.8           | Acceptable     |
| Comparative Fit Index (CFI) | 0.931               | >0.8           | Acceptable     |
| Goodness-of-Fit Index (GFI) | 0.828               | >0.8           | Acceptable     |
| Adjusted Goodness-of-Fit Index (AGFI) | 0.801 | >0.8 | Acceptable |
| Root Mean Square Error (RMSEA) | 0.042               | <0.07          | Excellent      |

Table 6. Direct, indirect effect, and total effects.

| No. | Variable | Direct Effects | p-Value | Indirect Effects | p-Value | Total Effects | p-Value |
|-----|----------|----------------|---------|------------------|---------|---------------|---------|
| 1   | KV-PS    | 0.331          | 0.002   | 0.331            | 0.002   |               |         |
| 2   | KV-SS    |                |         | 0.017            | 0.394   | 0.017         | 0.394   |
| 3   | KV-PBC   |                |         | 0.035            | 0.031   | 0.035         | 0.031   |
| 4   | KV-WF    |                |         | 0.037            | 0.031   | 0.037         | 0.031   |
| 5   | KV-AD    |                |         | 0.041            | 0.03    | 0.041         | 0.03    |
4. Discussion

The current study used the Protection Motivation Theory (PMT) and the extended Theory of Planned Behavior (TPB) to assess the factors that influence the perceived effectiveness of the government’s response to COVID-19 vaccination in Occidental Mindoro. Knowledge of COVID-19 vaccination (K), perceived severity (PS), perceived behavioral control (PBC), subjective standards (SS), willingness to follow (WF), adaptive behavior (AD), actual behavior (AB), perceived government response (PGR), and perceived effectiveness (PE) were all investigated using SEM. Through an online questionnaire, a total of 400 data samples were collected.

According to the SEM, the knowledge of COVID-19 vaccination showed a significant direct effect on PS (β: 0.331, p = 0.002). In order to combat COVID-19, it is critical to raise public knowledge about the disease. Similarly, in the study of Alrefaei et al. (2022), they indicated that people will be more likely to adopt and apply government guidance, especially regarding the vaccination if they understand it [78]. People who do not know enough or do not know enough about the COVID-19 vaccine may still be under pressure and have doubts. Individuals’ views of varied news and information, whether positive or negative, influence their understanding, which determines their decision to be vaccinated or not. It is necessary to understand the COVID-19 vaccine to improve health promotion and minimize immunization barriers. SEM also revealed that SS had a significant negative effect on W (β: −0.027, p = 0.054). According to the theory of reasoned action, an individual’s willingness to follow is determined by their intention and desired outcome, not by subjective standards.
On the other hand, PBC has been shown to improve WF ($\beta = 0.054$, $p = 0.001$). According to Workman et al. (2008), self-efficacy significantly influences a person’s ability to complete tasks. If a person believes he or she can keep up with the new environment, he or she will be able to independently follow new legislation and the changing environment of the worldwide pandemic. Furthermore, a person with certainty has the freedom to decide whether or not to get vaccinated based on their health situation [24].

In terms of perceived government response, the results showed that AD ($\beta: 0.054; p = 0.192$) and AB ($\beta: 0.686; p = 0.001$) substantially impacted PGR. In addition, Mansoor (2021) implied that the government developing policies and solutions is essential to the public’s reactions to the pandemic. This leads to the public’s trust in the government being essential for this scenario [79]. The government maintains track of civilians’ thoughts, feelings, suffering, and dealing with the circumstance and how they perceive danger, emotions, and behavior in relation to the COVID-19 epidemic that is currently in effect.

Alternatives recommended by the government included voluntary physical distance, face masks, face shields, mass testing, and school cancellations. Meanwhile, the perceived government response was found to affect PE ($\beta: 1.002; p = 0.003$) significantly. Individuals must voluntarily follow the government’s new policies to be effective. In addition, Nwakasi et al. (2022) revealed that gender, education, residence town, stigma, perceived threat, and government confidence are all relevant characteristics that can influence compliance with public health mandates [80]. The government should first learn about their citizens’ reactions to the pandemic and gather data to benefit everyone’s well-being. With this, the government can create policies based on citizens’ abilities to implement them.

According to the findings, we had a substantial beneficial influence on AB ($\beta: 1.122; p = 0.002$). If people follow the rules, such as wearing face masks outside and keeping physical distances in mind, they may see positive results such as fewer COVID-19 cases and a healthier body. Additionally, people who look to be in good health following vaccination may convince others to get vaccinated. Additionally, explaining the FDA’s vaccine approval procedure and emphasizing the pandemic’s economic toll had the most significant impact on people’s desire to take the vaccination. The FDA therapy raises the chances of increased vaccination willingness [81].

On the other hand, the SEM revealed that WF has a substantial negative influence on AD ($\beta: -0.383; p = 0.002$). It could imply that no other considerations impact a person’s decisions. According to the theory of planned behavior, fear, emotion, or previous experiences have no bearing on a person’s decision to engage in an activity.

Meanwhile, PBC ($\beta: 0.106; p = 0.037$) and SS ($\beta: 0.057; p = 0.419$) had substantial direct effects on perceived severity (PS). As a result, assurance aids individuals in deciding whether or not to get vaccinated and how to react to the COVID-19 vaccine’s effects. It also takes into account an individual’s perspective on the environment. If a person’s surroundings were shown to cause serious consequences or disease, he or she would imagine the same thing occurring to him or her, which would significantly impact their behavior. Individuals with low perceived severity and low government satisfaction made the least behavioral changes, while those with high perceived severity and low government satisfaction made the greatest.

Surprisingly, since the two paths connecting perceived vulnerability to subjective standard (0.216) and perceived behavioral control (0.76) were not significant because their $p$-values were greater than 0.5, the latent variable perceived vulnerability did not affect the latent variable perceived effectiveness. This was in contrast with Li et al. (2020), who asserted that perceived vulnerability directly affects perceived behavioral control through people’s engagement and compliance with COVID-19 regulations [17].

Despite the valuable contributions, the authors would like to state several limitations of the current study. First, this study was primarily focused only on one area of the Philippines. Future research might try to conduct research all over the country to see more valuable results, which might be used to see the differences in the results between the places in the country. Second, our sample was collected online through convenience sampling.
Future studies might collect data face to face to avoid any bias and to obtain more valuable input from the researchers. Lastly, the researchers did not include mental health factors that might contribute to the results of the study. Future research might include several factors such as mental health during the pandemic that might give relevant information to the research community.

5. Conclusions

The government should start informing the public about the essential information and other information the nation needs to know about the COVID-19 vaccination to not make the public doubt that knowledge on COVID-19 vaccination has a significant effect on perceived severity (0.331), which are the factors that stand first in line before the other factors. Then, the government agencies should pass on facts about various vaccines, processes, schedules, and side effects to not lessen the percentage of individuals accepting COVID-19 vaccination because the factor perceived severity has a significant effect on perceived behavioral control (0.106). In connection with the last statement, perceived severity has a significant effect on subjective standard (0.052). Government agencies should consider the subjective standards that most citizens abide by (Department of Health, 2021). The factors perceived behavioral control and willingness to follow had a significant relationship (1.054). The current study is one of the first to study the factors that affect the perceived effectiveness of government response toward COVID-19 vaccination. Finally, this study’s integrated PMT and extended TPB may be implemented and extended to evaluate the perceived success of government response toward COVID-19 vaccination in other countries.

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