Research Article

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An implementation of an extended theory of planned behavior to investigate consumer behavior on hygiene sanitation-certified livestock food products

https://doi.org/10.1515/opag-2022-0302
received January 31, 2024; accepted May 13, 2024

Abstract: Consumer acceptance of food safety has an important role in the success of hygiene sanitation standards with certification of veterinary control number (*Nomor Kontrol Veteriner*, hereinafter NKV) implementation for livestock-based food products. This study was conducted by applying the extended theory of planned behavior (TPB) to analyze the influence of attitudes toward NKV-certified food products, subjective norms (SN), perceived behavioral control (PBC), intention to buy, buying decision of NKV-certified food products, and knowledge. This study was conducted using a survey design, and data were collected from June to August 2023. Respondents were determined by a purposive sampling method. Data were collected using an online questionnaire and were analyzed with structural equation modeling-partial least squares software. The results showed that attitude toward NKV-certified food products, SN, and PBC influenced the intention to buy NKV-certified food products with β values of 0.377, 0.223, and 0.235, respectively. Then, PBC and intention to buy affected NKV-certified food product purchasing behavior with β = 0.304 and 0.340. Furthermore, knowledge affected attitude with β = 0.828 and purchasing behavior of NKV-certified food products β = 0.315 but did not significantly influence the intention to buy. This research implied that the intervention knowledge variable in TPB is valuable in predicting NKV-certified food product purchasing behavior. Continuous consumer education needs to be carried out by the government and other stakeholders in the food industry, in line with the NKV certification policy.

Keywords: certified food products, attitude, subjective norms, perceived behavioral control, knowledge, purchasing behavior

1 Introduction

Indonesia, with its 270 million people, is the fourth most populous country in the world [1]; therefore, it requires a sufficient availability of food, including food that is a source of animal protein. Hosain et al. [2] explained that high market demand drives the growth of the livestock industry in developing countries. However, as with other developing countries, there is still a lot of bacterial contamination of food which threatens food quality [3], specifically in livestock and fresh and processed products. Therefore, the massive increasing consumption of livestock products in developing countries also becomes a source of foodborne disease in the production process [4]. The Indonesian government enacted a policy to provide food safety guarantee by issuing Minister of Agriculture Regulation No. 11 of 2020. This regulation requires all business actors to submit a Veterinary Control Number (Indonesian abbreviation: NKV) certificate as a legal requirement that producers have passed hygiene and sanitation standards in the production process of food of animal origin. Starting from the time this regulation was established in 2020 until 2023, not many livestock food products, either fresh or processed, have been NKV-certified [5]. Consumer requirement is one of the drivers for produce to obtain safety certification [6], and not all certifications applied to livestock food products are well considered by consumers in fresh and processed food product evaluation [7]. The lack of consumer awareness of food safety is caused by the fact that

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consumer education did not receive much attention from the government when the NKV certification obligation was established. This is an important part of turning certification into an attribute that consumers consider to be important [8] because a previous study found that NKV certification is the least considered certification in product quality evaluation on processed milk products [7]. Therefore, increasing consumer awareness and knowledge about NKV certification education becomes crucial [5].

The theory of planned behavior (TPB) explains that attitude, subjective norms (SN), and perceived behavioral control (PBC) are the three important variables in predicting intention and buying behavior. TPB has been implemented to predict the buying behavior of halal-certified food products [9–11], organic food [12–20], sustainability-certified food [21], and genetically modified organic labeled food [22]. Previous studies have shown that TPB explains the buying behavior of certified food. However, NKV is a certification specifically to guarantee hygiene and sanitation aspects in the food production process, which consumers have not paid much attention to in developing countries. In this research, TPB was extended by adding a knowledge construct. This is important because previous research showed that knowledge increases attitude toward NKV-certified food products and willingness to NKV-certified food products [5]. On this basis, understanding the influence of attitude toward NKV-certified food products, SN, and PBC on purchasing intention of NKV-certified food products and purchasing of NKV-certified food products using the theory of planned behavior needs to be conducted. This research aimed to (1) analyze the influence of attitude toward NKV-certified food products, SN, and PBC to intention to buy NKV-certified food products; (2) analyze the effect of intention to buy NKV-certified food products and PBC to NKV-certified food product purchasing behavior; and (3) analyze the effect of attitude of NKV certification to attitude, intention to buy, and purchasing behavior of NKV-certified food products.

2 Theoretical framework

2.1 Attitude toward NKV-certified food products influences the intention to buy

Attitude is a set of beliefs about a particular object or action that drives the intention to act [23]. This indicates that a relationship exists between attitude and behavioral intention [24]. If a person has a positive attitude toward an action, then he will have a will to implement the behavior. Previous studies show that positive attitudes toward halal-certified food products influence the intention to buy halal food products [9], and certified organic food products [12,17,25], but this evidence was not supported in the context of buying behavior of nutrition-labeled food [26]. A later empirical study in Vietnam shows that attitude has an important contribution in influencing intention to buy food products that are certified safe [27]. Vietnam and Indonesia had similar patterns in livestock food product purchasing, where attitude affects purchasing behavior [28]. Based on this, a hypothesis can be proposed as follows:

H_1: Attitudes toward NKV-certified food significantly influence intention to buy NKV-certified food products.

2.2 The effect of SN on intention to buy NKV-certified food products

SN are social pressure that a person feels whether to carry out or not a behavior [23]. Furthermore, SN are perceptions of most people who consider them important to a person and think that he/she should or should not carry out a particular behavior [29,30]. Previous research shows that SN influence intention to buy relatively weaker [31] and even not significantly affect the intention to buy environmentally sustainable certified food products [32]. However, major studies show that SN play a key part in reaching the desired effect on purchasing halal-certified food products [10,33–36]. Similar results have been found in empirical studies using TPB in predicting intention to buy organic food products that SN play a vital role in influencing purchasing intentions [12,15,20,37–41]. Furthermore, the influence of family members, neighbors, and colleagues contributed to safety-labeled food-buying intention [27]. Based on this, a hypothesis can be proposed as follows:

H_2: SN positively influence the intention to buy NKV-certified food products.

2.3 PBC effect on the intention to buy and purchasing behavior

PBC is the ease a person feels when performing a behavior [23]. The more individuals believe they are in a condition that they can control, the easier it is for them to perform the behavior. Consumers have control over engaging in a behavior or preventing it from performing the behavior. In

Refs. [42,43], the authors stated that PBC is in line with a person's perception of the ability to perform a particular behavior. PBC reflects the extent of expected behavior under the influence and control capacity of individuals [39,44]. A previous study has shown that PBC did not influence the intention behavior of soil conservation [45] and safety-labeled food products [27].

In contrast, some studies in the food context found that PBC positively affects the buying intention of organic food [12,39,46,47], halal-certified food [48], and nutrition-labeled food [26]. The more control a person has, the higher the intention to buy. The greater control over purchasing food products, the more likely consumers are to do so. PBC was also found to affect the buying behavior of organic food [25] and environmentally safe food products [49]. Based on this review, the following hypotheses can be proposed.

H_3: PBC positively influences the intention to buy NKV-certified food products.

H_4: PBC positively affects NKV-certified food product purchasing behavior.

2.4 The influence of intention behavior on purchasing behavior

TPB explains that the formation of behavior is also driven by intention behavior. Ajzen [23] states that intention behavior is the main influencing factor in performing behavior. Intention to buy can be reflected as consumers' probable behavior for future short-term purchasing behavior [50]. Research on the relationship between intention and behavior has been conducted widely [51,52] and shows that intention positively affects behavior. Regarding this relationship, refs. [25,53,54] explain that the strong intention to buy organic-certified food increases the chances of buying behavior. An empirical study of nutrition-labeled food shows that intention to buy influences product purchasing behavior [26]. Based on this, the hypothesis is proposed as follows.

H_5: Intention to buy NKV-certified products positively influences NKV-certified food product purchasing behavior.

2.5 Effect of knowledge on attitude, intention to buy, and purchasing behavior

Knowledge is an important factor in influencing consumer behavior. In organic food industries, knowledge positively affects attitudes toward food products [55,56]. Besides, Smith and Paladino [57] stated that consumer knowledge of social and environmental issues also positively influence the attitude and buying behavior of organic food. Some findings from previous studies strengthen that attitude toward organic food products is influenced by consumer's knowledge [25,58–61]. The greater the consumers' knowledge of organic food, the higher the attitude toward organic food. Knowledge also influences the intention to buy organic food [60,62], certified food [7], and environmentally safe food products [63]. Likewise, D'Souza et al. [64] explained that the greater consumers' knowledge of the information contained in food labels, the larger the opportunity to purchase that food. Furthermore, consumers' knowledge of environmentally friendly product attributes influences their buying behavior [66,67]. Based on this, the following hypotheses can be proposed:

H_6: Knowledge of NKV certification positively influences attitude toward NKV-certified food products

H_7: Knowledge about NKV positively affects the intention to buy NKV-certified food products

H_8: Knowledge about NKV positively affects NKV-certified food product purchasing behavior

3 Methods

This research was conducted between June and November 2023 and involved a total of 300 respondents. A questionnaire was developed containing question items related to the respondent's profile, and the research variables were the following: attitude toward NKV-certified food products, SN, PBC, intention to purchase NKV-certified food products, and NKV-certified food products purchasing behavior. The measurement of the latent variables was carried out using a 5-point Likert scale. The sample was determined by using one of the purposive sampling types, which is a judgment sampling method to select respondents based on their unique characteristics and experiences that are relevant to the research topic [58]. The criteria used to select the respondents were (1) purchasing livestock food products in the last month and (2) a minimum age of 18 years. Data collection was carried out online, and the questionnaire was distributed through social media, possibly consisting of population members.

The data were analyzed using structural equation modeling with partial least squares software (PLS). Descriptive analysis was used to get a picture of the respondents' profiles, while PLS was used to carry out hypothesis testing. PLS works for a relatively small sample size and complex model, does not require multivariate normal distribution, and is

suitable for formative and reflective measurements [67]. PLS was used for hypothesis testing due to the capability of PLS to describe a complex relationship of latent variables [68]. This test was carried out by evaluating data according to the criteria of convergent validity and discriminant validity for the measurement model [69]. Hair et al. [70] explained that convergent validity is testing the indicators for the variables being used in the research to ensure that those indicators are interpreted correctly by using 0.5 as the minimum limit for the average convergent validity (AVE) score [24]. Furthermore, discriminant validity was carried out using the Fornell–Larcker criterion with the rule of thumb that the square root of the average variance extracted (AVE) by a construct must be greater than the correlation between the construct and any other construct [69] to indicate that a construct is not highly correlated with other constructs that should be different. Reliability testing was carried out by measuring the consistency of the question items in a construct, and it was measured using composite reliability and Cronbach's Alpha, using a score of 0.7 as the minimum value [70]. Next, an analysis was carried out to examine the relationship between the constructs; in this case, attitude toward NKV-certified food products, SN, PBC, intention to purchase NKV-certified food products, and purchase behavior toward NKV-certified food products. The relationship test was carried out by observing the size of the original sample value and a *t*-statistic that is above 1.95 or *p*-value <0.05.

Informed consent: Informed consent was obtained from all individuals included in this study.

Ethical approval: The research related to human use has complied with all relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the author's institutional review board or equivalent committee.

4 Results

4.1 Profile of respondents

Table 1 shows that 84.7% of respondents are aged 18–35 years, while 43.3% are men and 56.7% are women. The majority of respondents (55.7%) have a bachelor's degree education. In addition, 53% of respondents also have permanent employment; 20.0% have student status, and the rest are housewives or have some other working status.

Table 1: Characteristics of respondents

No	Characteristics	Number (*n*)	Percentage (%)
1	**Age group**		
	18–25	133	44.3
	26–35	121	40.4
	36–45	31	10.3
	46 and above	15	5.0
2	**Gender**		
	Woman	170	56.7
	Man	130	43.3
3	**Level of education**		
	Elementary/middle school	14	4.7
	SMA/SMK (senior high school)	74	24.6
	Diploma/bachelor	167	55.7
	Postgraduate/doctorate	45	15.0
4	**Work**		
	Government employees	25	8.4
	Private sector employees	82	27.3
	Self-employed	52	17.3
	Student/student	60	20.0
	Housewife	15	5.0
	Other	66	22.0

4.2 Measurement of validity and reliability

Table 2 shows the mean average of research indicators and constructs. Table 3 shows that the values for all research constructs are more than 0.5. These results indicate that the indicators used in this research have met the convergent validity criteria, namely that the indicators have agreed to be indicators that measure the intended latent variable [70]. Furthermore, the Fornell–Larcker test shows that all square roots of the AVE were greater than the correlation between the construct and any other construct; therefore, all the constructs had good discriminant validity (Table 4). The reliability test results show that the values for Cronbach's alpha and composite reliability for all constructs are above 0.7, meaning that all reflective indicators are consistent and appropriate as measuring tools for each construct. The *R*-square value for intention to purchase NKV-certified food products is 0.834, meaning that 83.40% of the intention to purchase NKV-certified food products variable is well explained by attitude toward NKV-certified food products, SN, and PBC. Meanwhile, the *R*-square value for NKV-certified food products purchasing behavior is 84.80%, indicating that variation in purchasing behavior can be explained well by the predictor variables, namely the intention to purchase and PBC. Then, the intervention of knowledge to the TPB showed that *R*-square for attitude

Table 2: Mean and deviation standard of latent variable indicators

Latent variables and indicators		Mean	Standard deviation
Attitude toward NKV-certified food products (AT)			
AT1	I feel that buying NKV-certified livestock-based food products is a wise action	3.750	1.192
AT2	I support people buying NKV-certified livestock-based food products	3.750	1.239
AT3	I believe that the NKV certification label is an indicator of food safety	3.750	1.236
Subjective norms (SN)			
SN1	My family and relatives think that I should buy NKV-certified livestock-based food products	3.473	1.247
SN2	My friends think that I should buy NKV-certified livestock-based food products	3.493	1.199
SN3	The government encourages people to consume NKV-certified livestock-based food products	3.530	1.190
SN4	Communication media (media-social, television, magazine, newspaper) support to buy NKV-certified livestock-based food products	3.447	1.252
SN5	Health experts (doctors, nutritionists, and health practitioners) support buying NKV-certified livestock-based food products	3.510	1.245
Perceived behavioral control (PBC)			
PBC1	I am able to make sure that livestock-food products I buy are safe to consume	3.750	1.211
PBC2	When I buy livestock-based food products, I can identify which one is NKV-certified	3.440	1.260
PBC3	For me, to get NKV-certified products around my place is easy	3.300	1.168
PBC4	Buying NKV-certified food products does not make my spending increase significantly	3.430	1.137
Intention to buy NKV-certified food products (IB)			
IB1	I plan to rebuy NKV-certified livestock food products	3.630	1.183
IB2	I will recommend NKV-certified food products to my friends/relatives	3.647	1.155
IB3	I will choose NKV-certified food products as my first choice when I go shopping	3.483	1.201
NKV-certified food products purchasing behavior of (PB)			
PB 1	I frequently buy NKV-certified food products	3.383	1.210
PB 2	I always buy NKV-certified food products	3.100	1.201
PB 3	I choose NKV-certified food products when it is available at the same price as the one not certified	3.623	1.273
PB 4	I do not mind buying again with higher prices for NKV-certified food products	3.380	1.144
Knowledge of NKV certification (KN)			
KN1	I understand that NKV-certified food products are safe to be consumed	3.607	1.230
KN2	I can distinguish NKV-certified food and which has not yet been certified	3.297	1.201
KN3	I noticed the logo of NKV certification	3.477	1.320

Table 3: Overview of measurement model

Variable	Cronbach's alpha	Composite reliability	AVE	*R*-squared (R^2)	*Q*-squared (Q^2)
Attitude toward NKV-certified food products	0.933	0.933	0.882	0.686	0.683
Intention to buy NKV-certified food products	0.926	0.926	0.871	0.848	0.798
NKV-certified food product purchasing behavior	0.909	0.910	0.786	0.834	0.816
Perceived behavioral control	0.902	0.903	0.773		
Knowledge of NKV Certification	0.921	0.923	0.864		
Subjective norms	0.932	0.933	0.787		

toward NKV certification was 0.686, meaning that knowledge was able to contribute to explaining the variation of the attitude variable at 68.60%. The predictive relevance (*Q*-square) value for intention to purchase is 0.798, and for purchase behavior, it is 0.816. Both values indicate high predictive relevance, above 0.35. These results also confirmed that the theory of planned behavior was relevant to predicting the purchasing behavior of NKV-certified products. Furthermore, the intervention latent variable of knowledge into the theory of planned behavior showed a well-constructed model in predicting NKV-certified food product purchasing behavior.

4.3 Hypothesis testing

Structural model result is shown in Table 5. Measurement and structural model analysis is shown in Figure 1.

Table 4: Results of Fornell–Larcker discriminant validity test

Variable	At	IB	PB	PBC	Kn	SN
At	0.939					
IB	0.886	0.934				
PB	0.833	0.864	0.887			
PBC	0.862	0.874	0.879	0.879		
KN	0.828	0.835	0.864	0.870	0.929	
SN	0.864	0.865	0.848	0.871	0.811	0.887

At: attitude toward NKV-certified food products; SN: subjective norms; PBC: perceived behavioral control; IB: intention to buy NKV-certified food products; PB: NKV-certified food products purchasing behavior KN: knowledge of NKV certification.

5 Discussion

The analysis results listed in Table 5 and Figure 1 show that all *t*-statistic values except H_7 are greater than 1.96, which means that these hypotheses were supported. Attitude toward NKV-certified food products, SN, and PBC influenced the intention to purchase NKV-certified food products with β values of 0.377, 0.223, and 0.235, respectively. Then, PBC and intention to buy affected purchasing behavior had β values of 0.340 and 0.304. The intervention of knowledge in the theory of planned behavior showed that knowledge influenced attitude toward NKV-certified products (β = 0.828) and purchasing behavior (β = 0.315), but not significant in intention to buy (β = 0.138). Furthermore, R^2 for attitude was 0.686, intention to buy was 0.848, and NKV-certified purchasing behavior was 0.834 (Table 3). The values of R^2 showed that the research predictor latent variables meaningfully explained the variables, as Hair et al. [70] determined that the value of R^2 more than 0.50 and 0.75 can be categorized as contributing moderate and substantial to explain variables (Table 4).

The influence of attitude toward NKV-certified food products on intention to purchase NKV-certified food products is greater than that of SN and PBC. This result is in line with research in Refs. [27,49,71], which explains that attitude is the main determinant of the formation of intention to buy, which means attitude influences behavior indirectly. Attitude as a predictor variable has been widely examined to study the impact of attitude on intention to purchase, such as those used in studies of organic certificates [19], international protection marking certificates [19], halal certificates [9,10], and security certificates [18]. Moreover, Sousa et al. [49] explained that attitude toward reading food labels determines the intention of consumers to use labeled food to make healthy choices. Nevertheless, attitude is not necessarily the only factor that influences intention; and other determining factors are SN and PBC [64].

Table 5: Structural model result

Hypo-thesis	Variable	Original sample (*O*)	*T*-statistics (*O*/STDEV)	*p*-values
H_1	Attitude toward NKV-certified food products → Intention to buy NKV-certified food products	0.377	4.859	0.000
H_2	SN → Intention to buy NKV-certified food products	0.223	3.202	0.001
H_3	PBC → Intention to buy NKV-certified food products	0.235	3.186	0.002
H_4	PBC → NKV-certified food product purchasing behavior	0.340	4.636	0.001
H_5	Intention to buy NKV-certified food products → NKV-certified food product purchasing behavior	0.304	3.618	0.000
H_6	Knowledge of NKV certification → Attitude toward NKV-certified food products	0.828	35.916	0.000
H_7	Knowledge of certification → Intention to buy NKV-certified food products	0.138	1.960	0.051
H_8	Knowledge of NKV certification → NKV-certified food product purchasing behavior	0.315	4.225	0.000

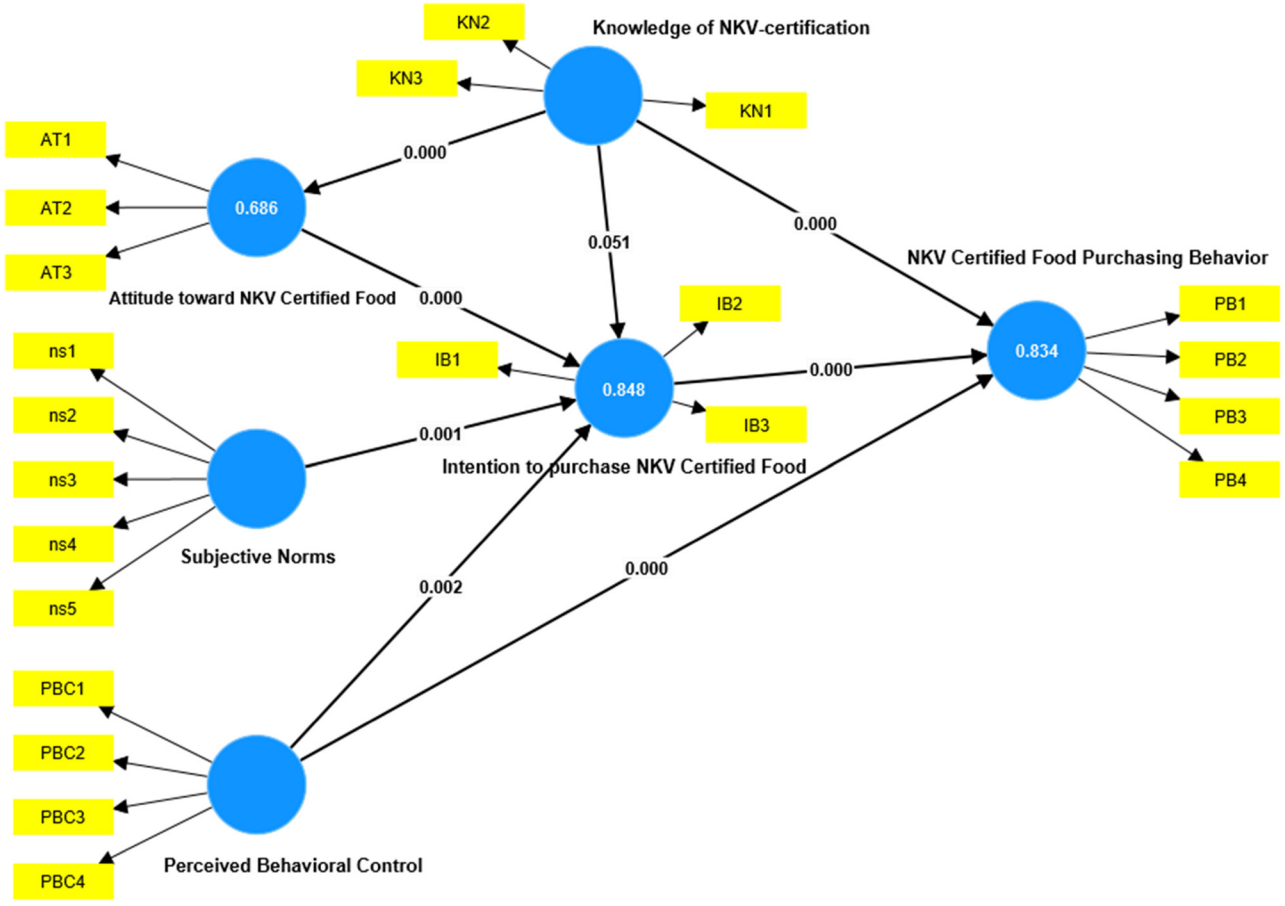

Figure 1: Measurement and structural model analysis.

The influence of SN in a previous study [72] showed that SN affect the purchasing of organic food. Similarly, in this research, even though the influence of SN was lower than attitude, this study found that respondents had positive pressure from the norms in their surrounding human environment to make purchases, thereby increasing the desire to purchase NKV-certified food products. This study was conducted in Indonesia; therefore, the role of SN still exists, as Ngo et al. [27] explained that the impact of social pressure on the buying process occurs more in developing countries because people prefer to interact with their local community to share information and experiences regarding food purchases. Pressure due to norms also comes from people who are considered important, including family members and peers [73]. Additionally, refs. [26,27,64] also revealed that consumers rely on evaluations or opinions of neighbors besides family members and colleagues. The results showed that the average perception that family, friends, government, and health experts encouraged respondents to consume NKV-certified was high, at 3.4–3.5, meaning norm pressure existed.

Furthermore, the influence of PBC on intention to buy was supported (β = 0.340) and also to NKV-certified food product purchase behavior (β = 0.304). The influence of PBC on NKV-certified purchasing behavior was greater than on purchasing intention, with β = 0.340 compared to β = 0.304. Product certification is generally printed or affixed to the package as NKV certification is and contains visual information to enable direct communication with consumers, thus giving consumers control over the ability to purchase NKV-certified products directly [74]. PBC is related to past experiences and individual anticipation to overcome obstacles [23], which, in the food context, is to overcome the possibility of consuming food that is contaminated by bacteria, which generally occurs in developing countries. Refs. [3,26] showed that perceived control over time and money positively influences the intention to buy nutrition-labeled food products. Currently, in Indonesia, livestock products are a basic necessity for daily life literature; therefore, based on the experience and the desire to overcome an obstacle, it is possible for spontaneous purchase behavior to occur due to the influence of

PBC without going through the mediation of the purchase intention variable first. Consumers' ease of noticing that products have passed safety quality control increases food buying behavior [75].

Moreover, the intervention of knowledge in the theory of planned behavior explains that knowledge has an important role in influencing decision-making indirectly through attitude or directly to purchasing behavior. This result is in line with that of Ref. [74], which states that consumers with sufficient knowledge of food-related hazards are aware of the importance of certified labeled food. Consumers' knowledge of food safety influences attitudes toward certified food products [25,75]. This strongly increases consumers' attitudes toward certified food and drives them to buy NKV-certified food directly [5]. Earlier studies support this finding that higher knowledge of environmental products increases the purchasing of green products [63,65,66].

Based on the results and discussion, this research concluded that attitude toward NKV-certified food products, SN, and PBC influence the intention to purchase NKV-certified food products. Furthermore, the intention to buy certified food products and PBC influences NKV-certified product purchase behavior. Besides, this research disclosed that knowledge is important in the decision-making process of NKV-certified food purchasing behavior through attitude, intention to buy, or directly influence purchasing behavior. The extension theory of planned behavior could explain attitude toward NKV-certified food behavior by 68.60%, intention to buy by 84.80%, and NKV-certified products purchasing behavior by 83.40%, respectively.

This research revealed that PBC, intention to buy, and knowledge of NKV were essential factors in determining the purchasing behavior of NKV-certified food products. Besides the contribution of TPB in predicting purchasing behavior, this research revealed that consumer knowledge about the certification of hygiene sanitation plays a crucial role. The knowledge embedded in a person's mind strongly affects attitude, which is also one of the main predictors of intention to buy. In other words, the probability of certified food purchasing behavior increases if the consumer has better knowledge of certification.

Regarding the food safety aspect in developing countries, such as Indonesia, the government is not sufficiently focused on the obligation of livestock food producers. The government needs to pay attention to the market readiness. This study found consumer with sufficient knowledge, attitude, and control over their resource to purchase will appreciate product hygiene-sanitation features. Therefore, this study recommends that the government, farmers, and other stakeholders are necessary to carry out continuous and intensive NKV education to develop community awareness of NKV certification and various health problems related to hygiene aspects. This education can be expected to increase consumer preference for NKV-certified products. Furthermore, as another policy implementation of this study, the government needs to create and deliver incentives for the farmers to keep competitive prices. Market expansion for NKV-certified food could be developed by requiring the business market to use NKV-certified products for processing and selling to end consumers.

Funding information: This project has received funding from Universitas Gadjah Mada, "Rekognisi Tugas Akhir" program under contract number 5075/UN1.P.II/Dit-Lit/PT.01.01/2023.

Author contributions: All authors have accepted responsibility for the entire content of this manuscript and consented to its submission to the journal, reviewed all the results and approved the final version of the manuscript. CPW has contributed to designing the research model, developing questionnaires, data collection, data analysis, and writing the paper. SPS has contributed to developing research models and questionnaires, interpreting data, and enriching the discussion. FTH has supported research model development and data interpretation.

Conflict of interest: Authors state no conflict of interest.

Informed consent: Informed consent was obtained from all individuals included in this study.

Ethical approval: The research related to human use has complied with all relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the author's institutional review board or equivalent committee.

Data availability statement: The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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