

Original Article

The influence of objective and subjective knowledge on attitude and willingness to pay veterinary control number-certified livestock food products

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Abstract

Objective: This study aims to analyse the effect of objective and subjective knowledge on attitude and willingness to pay for veterinary control number (Nomor Kontrol Veteriner) or NKV-certified food products.

Methods: The study was conducted by survey design. Respondents were determined by a judgmental sampling method with the criteria that respondents were at least 15 years old and contribute as full or part decision makers of food buying for him/herself or their family. Data were collected online by using questionnaires and analysed using path analysis with partial least squares software.

Results: The results show that objective knowledge ($\beta=0.20$, $t=1.97$) positively affected attitude toward NKV-certified food product, while subjective knowledge did not affect ($\beta= -0.10$; $t=1.44$). Then, attitude toward NKV-certified food product ($\beta=0.29$; $t=3.73$) affected willingness to pay for NKV-certified food product. Furthermore, willingness to pay was influenced directly by subjective knowledge ($\beta=0.34$; $t=6.37$) but objective knowledge influence was not significant ($\beta=-0.07$; $t=1.26$). The R^2 value for attitude toward certified food product was 0.05 and willingness to pay was 0.18.

Conclusions: This study concluded that willingness to pay for NKV-certified food product is directly influenced by subjective knowledge, and indirectly by objective knowledge through attitude toward NKV-certified food product.

Keywords: Attitude; Objective knowledge; Subjective knowledge; Veterinary control number; Willingness to pay

INTRODUCTION

Indonesia, with the average population growth 0.92% within 2015-2021 and population of 273.753.191 in 2021 [1] need to ensure food availability for the people. Moreover, Indonesia was experiencing rapid growth in economic rate 5.0% in 2022 similar to achievement economic rates prior to the Covid-19 outbreak, which were around 5.1% in 2017, 5.2% in 2018, and 5.0% in 2019 [1]. This economic growth

indicates a better public welfare, and impact to the increasing needs of animal-based proteins that are meat, milk, and eggs [2]. The aforementioned consumption increase also allows the farming sector to be one of the fastest developing agricultural economies in developed and developing countries [3].

However, there have been health issues that can potentially threaten livestock health as well as consumers therefore quality, in this case food security, becomes one of the most

imperative priorities. Livestock production no longer only refers to quantity but must also guarantee food security to be consumed safely without any doubts [4]. The responsibility of provisioning safe food is up to all supply chain stakeholders to ensure that these items are maintained well from farms, processing, to consumption without any detriments [5]. The Indonesian Ministry of Agriculture issued regulation namely Permentan No. 11, 2020 regarding certification of *Nomor Kontrol Veteriner* (Veterinary Control Number, hereinafter NKV) to guarantee food safety on all animal-based food businesses. Where, NKV itself is a legitimate written proof that all hygiene and sanitation requirements fulfil food safety on licensed animal-based business units. Since the NKV was issued in 2020, there are still an insubstantial number of these business units which have been certified with NKV, for example in layer poultry business. According to data provided by layer farmer association, Pinsar Petelur Nasional (PPN) up until 2022, less than 5% of the association members have been already licensed for NKV. Poultry meat business units of Garut Regency also show a similar trend, where only two have been certified [6]. Similarly, Sudarmiatin [7] found that only 21.4% chocolate farmers intended to implement production certification in Ghana, and likewise only 10% small-scale business already implemented for halal certifications [8].

Factors influencing producers to adopt certification are government regulations [9], opportunities to sell products at better prices [10], involvement of producers in associations as well as awareness applicants in their certification and business scales [7]. Low adoption of NKV certification is possible because certification incurs cost, on the other hand consumers are not yet consistent in valuing certified products higher than uncertified ones [10]. The success of certification adoption can happen on its own if additional costs for applying NKV can be balanced with increased benefits that will be obtained by certified service users [11]. Government socialisations on NKV have only been conducted massively on animal-based food producers to further the implementation of this certification [6], however, it has not been socialized yet on the general populace or

consumers. Previous study showed that not all certifications were realized as an important product attribute such as certification of environmental conservation is not perceived by consumers as an attribute that can raise brand equity as well as maintain premium selling prices [12]. For this reason, it is important to understand consumer attitude toward the NKV certified food product. Consumer knowledge, beliefs, attitudes, and behaviour are interdependent in food buying decision making and the relationship is somewhat still unclear.

Knowledge is an understanding of consumers on the benefits and how an object functions as well as influencing willingness of consumers to purchase novel products. The approach of measuring product knowledge can be conducted through two ways, firstly with a perceptual approach and secondly with actual measurements. Note that both of these parameters can also be measured altogether to attain better understanding on the decisions to purchase. Subjective knowledge is an individual perception regarding a product, on the other hand objective knowledge is an understanding of actual information detailing a product [13]. Attitude is an evaluation regarding an object that is related to the preference of a person and the inclusion attitude to predict certified food buying intention is important to mediate the relationship of knowledge and purchasing behaviour. The willingness of consumers to pay more for certain products is influenced by experiences and expectations of said consumers on the product [14]. This relates to the perception of attributes seen as superior in certain products, including food safety/security, thus there are consumers who pay more for food that has practised food production systems that meet the requirements. The willingness of consumers to pay more has a key role in driving producers to manufacture increasingly better products [15].

This discussion indicates that studies on products related to NKV certification from the point of view of consumers, which is aimed to measure objective and subjective knowledge on NKV as well as their effects on attitudes and willingness of consumers to buy certified food products, need to be conducted. This

Table 1. Characteristics of respondents

	Total respondents	Percentage (%)
Gender		
Male	65	29.68
Female	154	70.32
Age		
15 – 19	1	0.46
20 – 24	129	58.90
25 – 28	37	16.89
29 – 34	12	5.48
35 – 40	7	3.20
41 – 45	9	4.11
46 – 51	11	5.02
52 – 57	13	5.94
Education		
High School	91	41.55
Diploma	7	3.20
Bachelor	93	42.47
Post-graduate	28	12.79
Occupation		
Student	82	37.44
Worker	70	31.96
Self-business	36	16.44
Household works	12	5.48
Professional worker	9	4.11
Apprentice	10	4.57
Income per month		
< IDR 1.500.000	50	22.83
IDR 1.500.000 - IDR 2.500.000	43	19.63
IDR 2.500.001 - IDR 3.500.000	37	16.89
> IDR 3.500.000	89	40.64

study is important in implementing policies that can drive consumer appreciation for NKV-certified food product which is an important key to motivate animal-based food producers to apply for certifications which subsequently can turn around the low rates of NKV implemented in Indonesia.

MATERIALS AND METHODS

Materials

The research was conducted through surveys with questionnaires as a tool to aid data collection by inquiring respondents about demographic characteristics, and patterns of animal-based food purchases, as well as to measure objective and subjective knowledge of consumers regarding NKV certifications, attitude on NKV-certified food product, and their willingness to pay more for

these licensed products. A latent variable is a variable that cannot be directly observed or measured and to which the variable structure is not perfectly accessible and using measurement that is presumed to assess the variable or to which it's epistemic cannot be accessed without error. Construct subjective knowledge, attitude, and willingness to pay for NKV-certified food product, each was measured by 4 item questions with Likert scale 1-5, while objective knowledge was measured with 5 item questions of NKV certification with multiple choice form (Table 3) to measure the actual knowledge of respondents on NKV certification.

Methods

Data were collected online, and the questionnaire distribution was carried out through social media groups that possibly

Table 2. Pattern of livestock food products consumption

	Number of respondents	Percentage (%)
Frequency of shopping livestock food products in one month?		
≥ 4 times	61	27.85
3 - 4 times	129	58.90
1 - 2 times	29	13.24
The most livestock product frequently purchased		
Chicken meat	87	39.73
Beef	15	6.85
Milk	53	24.20
Egg	64	29.22
The most frequently processed milk purchased		
Ice cream	7	3.20
Cheese	9	4.11
Infant milk	1	0.46
UHT/Pasteurized milk	181	82.66
Yoghurt	21	9.59
The most frequently processed chicken meat purchased		
Chicken floss	3	1.37
Chicken fillet	1	0.46
Fried chicken	51	23.29
Chicken meatball	6	2.74
Chicken corned	6	2.74
Nugget	84	38.36
Sausage	68	31.05
The most frequently processed beef meat purchased		
Beef floss	9	4.11
Meatball	51	23.29
Corned	64	29.22
Beef Rendang	5	2.28
Sausage	88	40.18
None	2	0.91

consisted of members of the research population. Sample determined by judgmental sampling method with the criteria that respondents were (1) more than 15 years old (2) contributed as full or part food buying decision maker for him/herself or the family. The online survey was conducted to reach the respondents who were inaccessible due to geographical distance. A total 219 data were collected, and this number has met the minimum recommendation of sample size for a statistical power of 80%. Instrument validity was identified by the average variance extraction (AVE). Cronbach Alpha and composite reliability were used in the reliability test. Furthermore, data analysis for hypothesis testing was carried out by partial least square analysis to identify the relationship between the constructs.

RESULT

Profile of respondents and livestock purchasing pattern

Table 1 shows that majority of respondents were female (70.32%), aged in the range of 20–24 years 58.9%, and the formal education of respondents mostly were bachelor's degrees (42.47%). Then, 37.44% activities were students, followed by working in government/organisation/private company was 31.05% and the average income 40.64% was more than IDR. 3.500.000,-. Then, Table 2 shows the pattern of livestock purchasing. 58.90% of respondents bought the livestock product 3-4 times/month while 27.85% of respondents bought livestock products more than 4 times/month. Chicken meat, egg, and milk were chosen as the most frequent livestock

Table 3. Items, mean value, and standard deviation of variable indicators of objective knowledge

Code	Item questions	Total	Standard deviation
	Objective knowledge (X1)	3.18	0.97
OK1	In my opinion, NKV-certified food product fulfils requirement as follows: a. halal requirement as animal-based safety food product guarantee b. free from hazardous contaminants c. hygiene sanitation requirement d. b and c are correct	0.16	0.37
OK2	NKV certification is mandatory for business owner of: a. Slaughtered house b. Poultry farm (chicken/duck/quail) c. Animal based processed food business d. a and b are correct e. a, b are c correct	0.72	0.45
OK3	Logo of NKV usually is put on: a. Slaughtered house's wall b. Outside part of shop wall c. Food label d. Shop cooling room e. a,b,c,d are correct	0.65	0.48
OK4	In my opinion, hygiene sanitation certification for food product is a. Halal b. NKV c. BPOM d. Organic certificate e. All corrects	0.82	0.38
OK5	The products that are certified with NKV are produced by: a. Business units that have buildings, infrastructure, and business facilities that meet technical requirements for hygiene and sanitation b. Have technical workers and/or technical supervisors who have expertise/skills in the field of animal health c. Implement hygienic handling and/or processing procedures d. Implement Good Farming Practices (GFPs) e. a, b, c, d are all correct	0.82	0.39

products purchased by 39,73%, eggs 29,22%, and 24,20% of respondents respectively.

Measurement test

Validity and reliability test result was presented in Table 4 and AVE values of all constructs were in the range 0.74-1, above the minimum requirement 0.50. This indicated, more than fifty percent of the variance

indicators are part of the construct being measured. The reliability measurement indicated that all constructs met the requirements, with Cronbach Alpha 0.88-1 that suggesting all the indicators used in each construct are consistent to measure the construct. Then, the composite reliability values were in the range of 0.92-1, showing that all the items were good indicators of the

Table 4. Items, mean value, and standard deviation of variable indicators of objective knowledge, subjective knowledge, attitude, and willingness to pay of certified food product

Code	Variables and items	Mean	Standard deviation
Subjective Knowledge of NKV (X2)			
SK1	I believe that my level of knowledge about NKV-certified food products is broader than that of others in general	2.74	1.21
SK2	I believe that my level of knowledge about NKV-certified food products is greater compared to my close friends	2.86	1.21
SK3	I believe that I understand the function of NKV certification as a guarantee of hygiene and sanitation for animal-origin food	2.93	1.25
SK4	I believe that I understand NKV-certified food products that should be purchased	2.93	1.24
Attitude toward NKV-certified food product (Y1)			
ACFP1	I like food products that have been certified with NKV	4.45	0.67
ACFP12	For me, NKV-certified food products have added value	4.47	0.64
ACFP3	NKV-certified food products are just as good as imported products	4.42	0.83
ACFP4	NKV-certified food products indicate that the producers have gone through a rigorous inspection standard	4.45	0.63
Willingness to pay NKV-certified food product (Y2)			
WTP1	I do not mind paying more for livestock food products that are produced by businesses with facilities that meet hygiene and sanitation standards	3.65	1.27
WTP2	I am willing to pay more for livestock food products that are produced hygienically	3.69	1.28
WTP3	I am willing to pay more to buy livestock food products that are produced from farms that have implemented good farming practices	3.72	1.25
WTP4	I am willing to pay for products that are produced by workers who are supervised by someone with expertise in animal health	3.68	1.27

construct being measured. Thus, all subsequent constructs can be analysed without any reliability and validity concerns.

Structural model

The analysis test results listed in Table 6 and Figure 1 show that objective knowledge ($\beta=0.20$, $t=1.97$) positively affected attitude toward NKV-certified food product, while subjective knowledge ($\beta= -0.10$; $t=1.44$) positively affected willingness to pay for NKV-certified food product. Then, attitude toward NKV-certified food product ($\beta=0.29$; $t=3.73$) affected willingness to pay for certified food products. Furthermore, analysis results showed willingness to pay was influenced directly by subjective knowledge ($\beta=0.34$; $t=6.37$) but not objective knowledge ($\beta=-0.07$; $t=1.26$). The R^2 value for each of the evaluated constructs is calculated in the model estimation test (Table 6). The R^2

value of willingness to pay was 0.18 and attitude toward certified food products was 0.05.

DISCUSSION

Certification is issued by government or other authorities to provide information to consumers regarding food safety of a product, therefore increasing consumer trust on the producers [16]. These trusts will make certifications a considerable attribute on the consumers which will drive producers to aim for and implement them [9], as in the cases of *halal* [17] and organic product certifications [18]. Product certifications are commonly printed or pasted on the packages and contain visual information to allow direct communications to consumers [19]. Information provided on packages is the easiest route for consumers to identify and

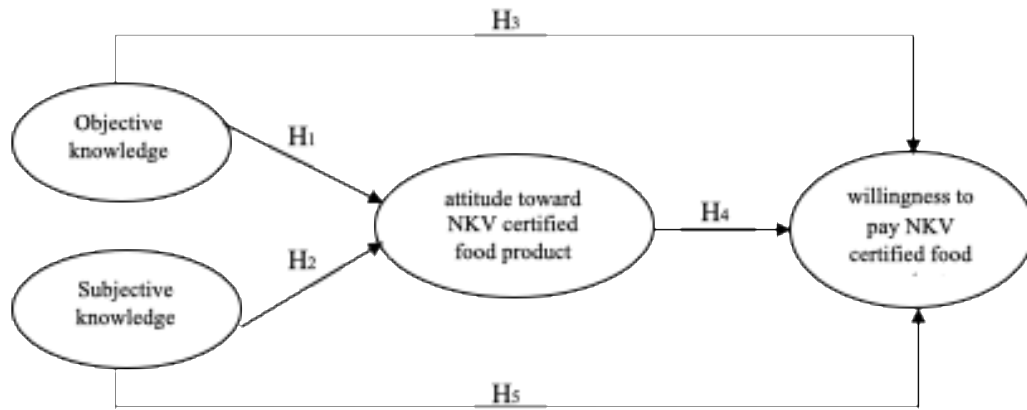


Figure 1. Research model

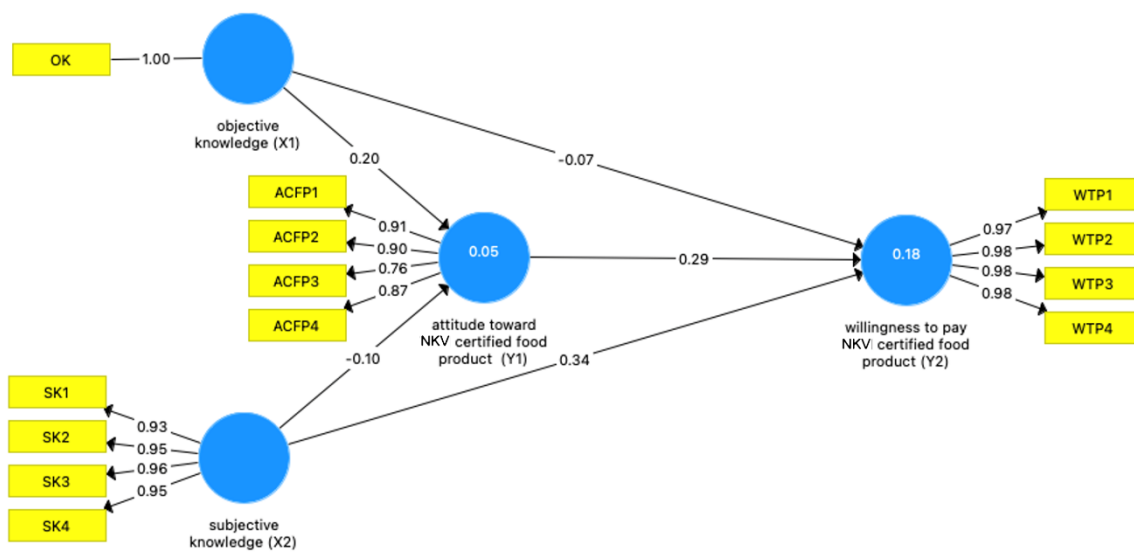


Figure 2. Measurement and structural model analysis

understand these attributes better, and it is action related knowledge in food products.

The study showed both objective and subjective knowledge influence willingness to pay even though each has a different route in stimulating demand for NKV-certified food products. This result showed that subjective knowledge had a direct positive influence on willingness to pay for NKV-certified food product with $\beta=0.34$ and $\text{sig}<0.01$. Subjective knowledge is an individual's perceptual knowledge of a product therefore when consumers believe that they understand the certification, then it will directly stimulate market demand for certified products. When someone has better product knowledge compared to others, then confirmation of attitude in buying decisions is no more needed.

Whilst objective knowledge had an indirect effect to affect willingness to pay through attitude toward certified food products. Table 3 showed that the total score of objective knowledge was 3.18 which indicates that the actual knowledge of respondents was sufficient and mean of attitude toward NKV-certified food product was high at 4.45. Respondents agree that NKV-certified food product has added value and they have positive knowledge to the products. When consumers understand the advantages of certified products they will follow conventional decision-making processes by developing a positive attitude toward the product and finding other information to reduce the risk of wrong food choices that possibly impact their health. Recent food scandals caused increasing

Table 5. Measurement model overview

Variable	Composite reliability	Cronbach's Alpha	AVE	R ²
Objective knowledge	-	-	-	-
Subjective knowledge	0.97	0.96	0.90	-
Attitude toward NKV -certified food product	0.92	0.88	0.74	0.05
Willingness to pay NKV-certified food product	0.99	0.96	0.96	0.18

consumer concern about the impact of food products on health. Therefore, consumers have become more rational and want better information before making decisions. Hence, purchases are becoming highly dependent on the degree of actual knowledge owned by consumers. This result confirms a study conducted by Borda *et al.* [20] that consumers who are more actually knowledgeable on food-related hazards will be more aware of the importance of the certified labelled food.

The role of this information of NKV on the food label becomes more important for credence's attribute claims that could not be viewed by consumers, including food safety process guarantee. Furthermore, supporting third-party credence information to back the safety claims will enhance product's credibility of food products [20,21]. Food has been viewed as low involvement products, however along with the increasing consumer welfare in Indonesia, it has been argued that food risk has increased product involvement and information needs [22]. Concerns of consumers on health made them more careful in selecting products and considering health impacts caused by their consumption, therefore certification becomes an alternative for important product information.

Willingness to pay for NKV-certified food product is directly influenced by subjective knowledge and indirectly affected by objective knowledge via attitude toward NKV-certified food product. The influence of subjective knowledge was found larger with $\beta=0.34$ compared to attitude which was $\beta=0.29$, however both influences are at moderate level. This can be understood because in general, food is a convenience product, therefore it could be bought immediately without any deep evaluation. Furthermore, willingness to pay for NKV-certified food product was relatively high at mean value of 3.69 which indicates that consumers do not mind to pay more for NKV-certified food products. Consumers would pay more for animal-based products from good farming practices as well as fulfilling hygiene and sanitation standards under the supervision of veterinary experts. The high value of willingness to pay is consistent with previous studies in several countries such as Thailand [23], China [24], Vietnam [25] and the European Union [26] which show that consumers are willing to pay more in purchasing safety certified food products. Several studies on the willingness of consumers to pay higher prices for safe beef meat [27] and also consumers are willing to

Table 6. Structural model result

Relationship	B	Overall model, n = 219 t statistic	p value
H1: Objective knowledge → Attitude toward NKV-certified food product	0.20	1.97	0.04*
H2: Subjective knowledge → Attitude toward NKV-certified food product	-0.10	1.44	0.15
H3: Objective knowledge → Willingness to pay NKV-certified food product	-0.07	1.26	0.21
H4: Attitude toward NKV-certified food product → Willingness to pay NKV-certified food product	0.29	3.73	0.00**
H5: Subjective knowledge → Willingness to pay NKV-certified food product	0.34	6.37	0.00**

*p < 0.05, **p < 0.01

purchase halal certified beef with a price 12-13% higher than usual [28].

This study also found that both the average consumer's objective and subjective knowledge was small, which indicates branding and marketing NKV certification itself has not yet been massively executed. Knowledge of certification is important to enhance brand equity of the product and market demand [11] in identifying certified products. Certifications easily fail if not supported by market demand and generate economic incentives to producers [12,29]. Halal certification has been successful in Indonesia because it improves company's performance [30] by increasing trust, intention to buy, satisfaction, and customer loyalty. Therefore, along with requiring farmers and other animal-based food producers, the government, in this case the Ministry of Agriculture, needs to develop and execute marketing and branding NKV certification to increase consumer awareness of NKV certification.

The R^2 value of willingness to pay was 0.18 and attitude toward certified food products was 0.05. The value of R^2 can be viewed as the magnitude of predictor latent variables were small because they were less than 0.25. It can be understood because this research aimed to explain specific behaviour on veterinary control number certified food products, and regarding the research problem it has been limited on two independent variables which are consumer objective and subjective knowledge on NKV certification.

CONCLUSION

This study implied that willingness to pay for NKV-certified food product is directly influenced by objective knowledge, while subjective knowledge does not affect. On the contrary, subjective knowledge positively influences attitude toward NKV-certified food product, and objective knowledge does not affect. Then attitude toward knowledge positively influences willingness to pay more for NKV -certified food product. This study also revealed the need to execute branding program of NKV certification to increase the

consideration of NKV certification in buying decision.

CONFLICT OF INTEREST

The authors declare no conflict of interest with any financial organisation regarding the material discussed in the manuscript. Authors contribution in this research were as follows: Suci Paramitasari Syahlani contributed in conceptualization, designing research model, writing, editing and revising the paper, Tian Jihadhan Wankar contributed in data collection, analysis, writing and Agung Triatmojo contributed in data analysis, interpretation, writing.

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