

## Research Article

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# Does product certification matter? A review of mechanism to influence customer loyalty in the poultry feed industry

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**Abstract:** Feed certification is released by authorized third parties as external cues indicating that products have met standard quality. However, farmers do not always take certification as the main consideration in product selection because of insufficient knowledge or they are skeptical about certification. This research aims to analyze the effect of feed certification, company image, opinion leader, perceived product quality, customer trust, and satisfaction to layer farmers' customer loyalty. Respondents were selected by using purposive sampling with the criteria that respondents were layer farmers with experience for at least 1 year and customers of concentrate or ready-made feed. Data were collected by using questionnaire and analyzed with the partial least square. Results show that feed certification influenced perceived product quality with  $\beta = 0.127$  and  $p \leq 0.1$ ; then, company image and opinion leader influenced perceived product quality with  $\beta = 0.690$  and  $\beta = 0.157$  at  $p \leq 0.05$ . Perceived product quality affected customer trust ( $\beta = 0.699$ ,  $p \leq 0.01$ ) and customer satisfaction ( $\beta = 0.689$ ,  $p \leq 0.05$ ). Then, customer trust and customer satisfaction positively influenced customer loyalty with

$\beta = 0.507$ , and  $\beta = 0.414$  at  $p \leq 0.01$ . Research findings indicated that feed certification was considered by layer farmers in feed purchasing behavior. However, company image was played as the most important factor among opinion leader and feed certification. These results implied that besides maintaining company image and the role of opinion leaders, feed mills and authorized institutions still urge to promote the importance of certification as product quality indicator.

**Keywords:** feed certification, company image, opinion leader, layer feed purchasing behavior

## 1 Introduction

The livestock industry in developing countries has experienced rapid growth to respond to high market demand [1]. Protein consumption in Indonesia in September 2019 reached 62.43 g/capita/day with weekly consumption average of chicken meat of roughly 0.11 kg/capita/week and eggs of approximately 0.13 kg/capita/week [2]. However, food is easily contaminated as it passes along the supply chain [3,4]. In developing countries, food product quality has been threatened by many problems [5,6] for example several antibiotics are still detected in food products [1] due to the lack of many food industries, governments, and customers in assessing the risk of food security [7]. Then, ref. [8] added, in upstream food product industry, low awareness and conformity of feed producers on feed quality standards may produce harmful food products. The livestock industry in developing countries contributes to rapid growth to supply food; further attention to livestock production is not limited only to concerning quantity but also to safety aspects [4,9,10]. Therefore, improvement of product safety is required in poultry including layer industry, starting from the origin of egg production such as controlling antimicrobial usage in livestock husbandry [11] that may affect egg product safety.

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Certification is designed as economic and credible guidance to simplify quality standard measurement and is released by third parties, such as government, industry, or non-government organizations [12]. Certification can only be used if the product has passed a certain set process or standards regulated by third party [13]. In Indonesia, government supervises and controls quality and safety aspects of commercial feed by issuing Regulation of The Ministry of Agriculture Republic Indonesia No.22/Permentan/PK.110/6/2017. Quality assurance and feed safety for poultry as stated in this regulation affirm that feed mills have to fulfill administrative and technical requirement. Indonesia government requires feed mills to ensure that the feed products have passed quality and safety assurance tests and the government issues Certification of Feed Quality and Safety for the feed products that have passed the quality tests [14]. Certification is product extrinsic cues, a product-related but not part of the physical product [15], and indicates product quality. Product quality can be measured based on customer's perspective and [16] defines perceived product quality as quality measurement based on consumer judgment regarding overall products' superiority. In feed products, customer's evaluation includes the ability of feed to support production, supporting services, product guarantee, ethical, and honest claims. Previous studies showed that certification influences purchasing buying behavior since the products may fulfill customer expectation [17], reduce customer risk perception [18], and meet warranty standards [19]. A good quality product raises customer trust [20], customer satisfaction [21,22], and customer loyalty [23]. Furthermore, refs. [24,25] explain that feed certification is important to guarantee product quality, revenue, competitiveness, customer satisfaction, business performance, and customer trust. However, feed mills have to pay additional costs and comply with the operational standard procedures [24]. These costs are substantial for small and medium enterprises [26]; therefore some feed mills ignore the obligation to certify their feed product. In Indonesia, uncertified feed sales remain good as indicated by the existence of medium companies in the industry. A total of 97 large-scale and 15 medium-scale feed mills in Indonesia have certified their product, while the rest are still on the list to be licensed. The most common certification owned by feed manufacturers in Indonesia is Certificate of Feed Quality and Safety, issued by Ministry of Agriculture. However, according to [27], consumers do not take certification as the main consideration in product selection because consumers do not always have sufficient knowledge about certification or are even skeptic about the certification process or organization. Previous research [28] showed that in

Zambia, certification was not compulsory yet, only one feed mill was ISO 2200 certified while six other companies were not certified because their focus was on local market. Then, ref. [29] explains that product certification does not imply product value but price is the important factor that influences consumers' buying decision. Another consideration in farmer's product choice is opinion leader. Opinion leader is a person with the ability to influence beliefs, attitudes, and behaviors of his/her social community [30,31] and influences people through their competence, integrity, and righteousness [34]. Positive or negative comments based on opinion leaders' experience of certain products may promote another way around, obstruct purchasing products [31]. Afterward, company image is also the factor that potentially influences buying behavior. Previous research shows that company image is important factor to increase customer impressions to the company [33] and influencing perceived product quality [34] and product trust [35,36]. Good company image influences purchase intention [36,37], customer satisfaction, and loyalty [32].

Research on product certification has been conducted quite massive [17,19,27,38–44]. However, specific research on feed certification is still limited. Forgoing study by ref. [45] was particularly conducted to redefine organic regulation to certify feed products. The roles of feed certification in farmers' decision-making have not been explored, while certification has become mandatory for feed companies in Indonesia, although it has not yet been implemented successfully to all business scale. Therefore, this research aims to study the role of feed certification as well as company image and opinion leader to farmer's feed purchasing behavior through several constructs of purchasing behavior that are perceived product quality, customer trust, satisfaction, and loyalty.

## 2 Theoretical framework

### 2.1 Product certification and perceived product quality

Producers protect their intellectual property by making component knowledge of the product inaccessible to buyers. However, in business market, the importance of raw material component knowledge is increased but on the other side, content material is not observable and needs a complex, sophisticated technique and high expense to assess. Third party certification resolves the information asymmetries to match willingness of buyers to pay for higher quality and suppliers' commitment to offer

the desired quality production [12]. Product certification is issued for products that have passed quality standard tests on various aspects, such as environmental impact management, animal welfare, climate change, human rights, and company obedience standard on human resources management [27]. Product certification works as external attribute of signal quality [46] that is getting more important in very tight business competition [27,47]. Through its guarantee, certification creates positive psychological impact on product quality [48] and simplifies process of product choice [17,27]. Certification is also legal indicator of product's authenticity [17,49] and reduces consumer risk perception [50]. Regardless not all consumers consider product certification [27], previous studies show that certification provides simplicity for the consumer to measure product quality and increases consumer belief of product expectation fulfillment [17], and farmers' revenue [51]. Therefore, certification will increase consumer evaluation on the overall attributes of the product. These descriptions refer to a hypothesis as follows:

H1. Product certification positively affects perceived product quality.

## 2.2 Company image effects on perceived product quality

Company image is a comprehensive consumer evaluation of a company that influences consumers' purchase intention [36,37]. Company image has an important role for companies in very tight competition in industries [47] because it can increase perceived product quality, consumer's trust toward products [35,36], customer satisfaction, and customer loyalty through communicating positive word of mouth about brand and company [32,35], particularly for customers who are critically sensitive toward quality and avoiding supplier hazard morals [52]. Therefore, a good company image inflates consumer evaluation process and the hypothesis can be stated as follows:

H2. Company image has a positive effect on the perceived product quality.

## 2.3 Opinion leader effects on perceived product quality

Opinion leader is described as a person with the ability to influence belief, attitude, and behavior of his/her social community [30,31]. Opinion leaders are the ones who share information, give recommendation, reduce risk,

and provide positive feedback on their followers' buying behavior [53]. Persuasive messages of opinion leaders are capable to change attitude and buying risk perceptions [54]. Roles of opinion leaders become more important when product contains intangible attributes, which increase the risk of consumers in product buying. Input supply is one of the causes of production risk associated with productivity in poultry industry [55]. Farmers tend to consider the recommendation from opinion leaders in developing perceived product quality [56] and purchase decision-making [31,57] in regard to reduce the risk of getting poor feed quality. Positive or negative comments based on opinion leaders' experience of certain products may promote or, the other way around, obstruct purchasing products [31]. Based on the foregoing literature, the hypothesis is stated as follows:

H3. Opinion leader has a positive effect on perceived product quality.

## 2.4 Perceived product quality, customer trust, and customer satisfaction

Perceived quality is multi-dimensional entity and can be identified differently depending on research schools [58], and it is defined as a subjective comparison by consumers of expected and perceived overall performance of products [16,59,60]. Perceived product quality develops customer trust and customer satisfaction. Considerable research has been conducted to analyze the influence of perceived product quality to customer trust [63–66] and customer satisfaction [32,67–69], when in its turn to direct to customer loyalty and customer happiness and the general pattern from its structural line is valid in five countries, which is China, Hong Kong, Japan, South Korea, and Singapore [66]. Perceived product quality determines the business success or failure and influences the products and service acceptance rate for business organization [65]. Furthermore, it is found that there is an indirect effect of customer satisfaction toward customer loyalty through stronger CRM quality when the brand image is high [32]. Perceived product quality reduces product failure risk, eventually it is increasing customer trust and customer satisfaction [62]. Therefore, the following hypotheses concern the role of perceived product quality as antecedent of customer trust and satisfaction.

H4. Perceived product quality has a positive effect on the customer trust.

H5. Perceived product quality has a positive effect on the customer satisfaction.

## 2.5 Effects of customer trust, customer satisfaction on customer loyalty

Customer trust is one of essential factors to develop customer loyalty to the firm [68]. Customer trust can be defined as customers' concern that supplier is dependable and keep their promises [69]. On the other hand, customer satisfaction is an individual feeling resulting from comparing a product's perceived performance or outcome against his/her expectations [70]. Several studies showed that customer trust influences customer loyalty [63] and customer satisfaction [71,72]. Similar result is reported by refs. [73,74] that besides trust, customer satisfaction has a positive effect on customer loyalty. A good image gives indirect positive effects on customer loyalty, mediated through quality perception and belief, and perceived product quality which in its turn, influences loyalty indirectly through satisfaction and trust. Trust is expected to reduce an uncertainty perception and risk and then increase consumer perception about company performance [37] that consumers have a strong commitment to re-purchase consistently in the future, although there is a potency of transition behavior as an impact of situational and marketing effort [63]. These descriptions refer to hypotheses as follows:

H6. Customer trust has a positive effect to the customer loyalty.

H7. Customer satisfaction has a positive effect to the customer loyalty.

## 3 Materials and methods

Research was conducted in several provinces known as layer farm centers, such as West Java, Central Java, East Java, Banten, South Sumatra, and Bali, from May until June 2021. West Java has the highest contribution to supply eggs in Indonesia for about 32.47%, then Central Java at 12.97%, East Java at 11.11%, Banten at 5.00%, Bali at 3.68%, and South Sumatra at 3.60% [75]. Respondents were selected by purposive sampling methods based on certain criteria [76] that were (1) layer chicken farmers located in Indonesia and has been operated for at least 1 year and (2) customer of ready-made or concentrate feed from feed mill. Online questionnaire was distributed to 403 farmers, and response rate was 49.63%. A total of 200 questionnaires were returned but 45 were not completely filled in and resulted 155 respondents. The questionnaire covered questions about demographic characteristics, feed purchasing patterns, and research constructs were feed

certification, opinion leader, company image, perceived product quality, customer trust, customer satisfaction, and customer loyalty.

Data were analyzed that Likert scale 1–5 was used for variable measurement scale and data were analyzed with partial least square (PLS) that is structural equation modeling data analysis to examine multilevel relationships between latent variables measured and based on principal components regression approaches that work with less restrictive requirements. PLS works for relatively small sample size and complex model, does not require multivariate normal distribution, and is suitable for formative and reflective measurements [77].

Convergent and discriminant validity and reliability were analyzed for all construct indicators for measurement model [78] to ensure that data meet validity standard requirement. Validity was tested by calculating average variance extracted (AVE) score and using AVE score >0.5 as a baseline to determine that constructs meet the good convergent validity score [79] and to obtain a good interpretation and high chance of research outcome application [80]. Reliability test was conducted to measure the consistency of question items with composite reliability (CR) of 0.70 [81] and Cronbach's alpha. PLS was used for hypothesis testing due to the capability of PLS to describe a complex relationship of latent variables [82].

**Informed consent:** Informed consent has been obtained from all individuals included in this study.

**Ethical approval:** The conducted research is not related to either human or animal use.

## 4 Results and discussion

Table 1 shows that majority of respondents were men (84.52%), aged in the range 21–60 years (95%), and bachelor's degree (54.84%). Most legal entity farms were private (89.68%), 37.42% of respondents had 10 years farming experience and 55.48% were members of layer associations. Table 2 shows that most respondents understood that feed should meet the Indonesian National Standard requirement (36.13%) and has safety quality certificate (44.52%). Feed quality was the most important attribute in the decision-making process and other respondents accessed information from product labels (51.48%) and salespersons (37.27%) to get feed nutrition information. Most respondents (59.35%) purchased concentrate feed

**Table 1:** Respondent characteristics

Characteristic	Number	Percentage
Gender		
Male	131	84.52
Female	24	15.48
Age group (years)		
21–30	27	17.42
31–40	61	39.35
41–50	42	27.10
51–60	19	12.26
61–70	6	3.87
Education		
Elementary school	2	1.29
Junior high school	9	5.80
Senior high school	46	29.68
Diploma	13	8.39
Bachelor	85	54.84
Main occupation		
Farmer	110	70.97
Trader	8	5.16
Employee	32	20.64
Other	5	3.23
Form of business		
Individual	139	89.68
Partnership	8	5.16
Company	8	5.16
Join association		
Yes	86	55.48
No	69	44.52
Farm work experience (years)		
<5	49	31.61
5–10	48	30.97
>10	58	37.42
Number of poultry (animal)		
≤1,000–11,500	114	72.26
11,501–50,000	24	14.84
50,001–230,000	17	12.90

and 41.65% of the rest chose ready-made feed. Respondents bought feed from poultry shops (32.54%) and companies owned marketing channels (37.28%) and most of them used credit payment systems (81.07%).

Table 3 shows mean average of research indicators and constructs. Measurement validity testing of research indicators resulted AVE score of constructs between 0.694 and 0.872 that have met minimum requirement of 0.50 [79]. Those indicated that all latent constructs contain more than 50% variance in measurement indicators and have met discriminant and convergent validity criteria [83]. Then, reliability testing showed that construct CR scores were 0.941–0.972 and Cronbach alpha's scores were between 0.889 and 0.966. all reliability scores were higher than 0.70, suggesting that all construct indicators had good internal consistency [84]. Therefore, all constructs

**Table 2:** Poultry feed purchasing pattern

Description	Number	Percentage
Farmer's knowledge on concept of feed certification		
Feed made according to Indonesian National Standard/Minimum Technical Requirement	56	36.13
Has safety quality certificate	69	44.52
Has passed laboratory test	29	18.71
Not suitable for livestock need	1	0.64
Important factors to consider of feed purchase		
Not torn sack	3	1.94
Type of feed match to consumer need	18	11.61
Company brand	8	5.16
Feed quality	126	81.29
Source of feed nutrition information		
Salespeople	58	37.42
Poultry shop	12	7.74
Extension worker	3	1.94
Feed label	80	51.61
Others	2	1.29
Experiencing feed buying disappointment		
Total farmers	155	
Yes	100	64.52
Never	55	35.48
Small-scale farmers (<1,000–11,500 hens)	114	
Yes	69	60.52
Never	45	39.47
Medium-scale farmers (11,501–50,000 hens)	24	
Yes	17	70.83
Never	7	29.17
Large-scale farmers (>50,000 hens)	17	
Yes	14	82.35
Never	3	17.65
Type of feed bought		
Concentrate	92	59.35
Ready-made feed	34	40.65

have met the measurement test qualification for further analysis.

Structural model testing result in Table 5 showed that the  $R^2$  value of customer loyalty was 0.739, the customer satisfaction was 0.475, the customer trust was 0.489, and the perceived product quality was 0.789.  $R^2$  values result of the relationships showed that all predictor latent variables contribute meaningful effect given that  $R^2$  values were higher than 0.25. Ref. [78] determined that the value of  $R^2$  0.25, 0.50, and 0.75 can be categorized as small, moderate, and substantial effects, respectively (Table 4).

Hypothesis testing (Figure 1 and Table 5) showed the result that feed certification influenced perceived product

**Table 3:** Mean and deviation standard of indicators and constructs

Research item	Mean	Deviation standard
<b>Feed certification (FC)</b>	4.40	0.83
FC1 Feed certification guarantees the usage of standardized poultry feed.	4.50	0.84
FC2 Feed certification guarantees poultry feed production process follows standardized procedure	4.53	0.69
FC3 Government feed certification guarantees the quality of feed	4.41	0.82
FC4 Feed certification guarantees attainment of feed conversion ratio (FCR)	4.25	0.97
FC5 Feed certification convinced farmers to keep the job	4.40	0.82
FC6 Feed certification is giving hope for farmers to receive better profit	4.33	0.87
<b>Company image (CI)</b>		
Feed mill that supplies feed to my farm	4.29	0.93
CI1 Gives good response to customer complaints	4.14	1.02
CI2 Is always trying to meet customer demand	4.22	0.97
CI3 Facilitates credit payment	4.27	1.02
CI4 Produces excellent product	4.37	0.84
CI5 Gives good service to costumer	4.44	0.79
<b>Opinion leader (OL)</b>	4.18	0.87
There is someone other than the seller who is		
OL1 Trusted in providing product information	4.18	0.86
OL2 Has expertise in feed product	4.23	0.85
OL3 Able to strengthen my purchase decision	4.17	0.87
OL4 Able to inform feed clearly	4.21	0.85
OL5 Able to provide product recommendation	4.13	0.93
<b>Perceived product quality (PQ)</b>	4.32	0.88
Feed mill that supplies feed to my farm		
PQ1 Gives better service compare to similar company	4.32	0.82
PQ2 Produces feed product that supports farm productivity	4.43	0.78
PQ3 Produces feed that meets quality guarantee	4.31	0.87
PQ4 Considers business ethics in feed production	4.21	0.99
PQ5 Adds product label with honest information	4.31	0.95
<b>Customer trust (CT)</b>		
Feed product used on my farm:	4.09	1.00
CT1 Produces a higher egg production/weight gain	4.24	0.80
CT2 Helps farmers to achieve production performance	4.17	0.85
CT3 Has always a consistent quality	4.00	1.09
CT4 Can be returned if product does not meet quality standard	3.81	1.35
CT5 Feed product promises farmers the security	4.21	0.91
<b>Customer satisfaction (CS)</b>	4.20	0.85
CS1 Decision to choose this poultry feed makes me happy	4.16	0.85
CS2 My choice to purchase this poultry feed is correct	4.20	0.86
CS3 I feel comfortable with my decision to choose this poultry feed	4.25	0.83
CS4 In my opinion, decision to use this poultry feed is correct	4.21	0.83
CS5 I will have the same feeling in choosing this feed if I redo it	4.17	0.87
CS6 I am happy with my experience using this feed	4.19	0.86
<b>Customer loyalty (CL)</b>	3.89	0.96
CL1 I will continue to use this product	4.12	0.91
CL2 When I discuss the feed with other farmers, I give compliment to the feed	3.82	0.98
CL3 When I receive any offer from other companies, I will give my compliment the feed that I used to be	3.79	0.98
CL4 In the future, I will appreciate this poultry feed for quite a long time	3.96	0.90
CL5 I am disposed to repurchase this feed	4.04	0.88
CL6 I am disposed to purchase this feed in the future, even though the price is increasing	3.64	1.14

quality with  $\beta = 0.127$  and  $p \leq 0.1$ . Then, perceived product quality also affected by company image and opinion leader with  $\beta = 0.690$  and  $\beta = 0.157$ , respectively, at  $p \leq 0.05$ . Furthermore, perceived product quality significantly

influenced customer trust with  $\beta = 0.699$  and customer satisfaction with  $\beta = 0.689$ . Finally, customer trust ( $\beta = 0.507$ ) and customer satisfaction ( $\beta = 0.414$ ) influenced customer loyalty significantly at  $p \leq 0.05$ .

This research showed that perceived product quality was significantly affected by feed certification ( $p \leq 0.1$ ). Feed certification acts as a signal for customers in describing product quality [85,86] and as a guidance for customers in determining a better product choice [17,27], and this role becomes more important to feed mills that are experiencing rising competition [27,47]. Table 3 shows mean average of feed certification construct has shown high score that was 4.40 with the highest mean average 4.53 on the indicator “certification gives guarantee that poultry feed production process follows standardized procedure.” This score means respondents agreed that product quality could be increased as certification ensures authenticity and quality of products [17,49]. This result was consistent to [87] that shows product certification influences perceived product quality as well as other previous studies of food industry in Thailand [88], China [89], Vietnam [90], and European Union [91].

Feed certification was found more important for smallholder farmers as indicated that mean average of feed certification for smallholder farmers (<11,500 hens) was higher at 4.49 compared to middle-scale farmers at 4.11 (11,500–50,000 hens) and large-scale farmers at 4.27 (>50,000 hens). The lack of recording systems in smallholder farmers potentially lead to profit loss risk [92]; therefore, certification assures smallholder farmers to reduce the risk [18] of choosing feed brand in poultry production. Small influence of feed certification to product perceive quality with  $\beta = 0.127$  less than 0.25. Ref. [81] suggests the government to intensively educate farmers regarding the benefit of feed certification.

Afterward, company image significantly influenced perceived product quality with coefficient  $\beta = 0.690$ , and this result is consistent to previous studies [35,36]. This result showed that company image contributes to develop customer perceived product quality. This finding confirmed the important role of company image as an extrinsic signal of product in affecting perceived product quality [47] as shown in Table 3, the mean average of

**Table 4:** Measurement model overview

	AVE	CR	$R^2$	Cronbach's alpha
Feed certification	0.731	0.942	—	0.925
Company image	0.694	0.918	—	0.889
Opinion leader	0.872	0.972	—	0.963
Perceived product quality	0.796	0.951	0.789	0.935
Customer trust	0.761	0.941	0.489	0.921
Customer satisfaction	0.854	0.972	0.475	0.966
Customer loyalty	0.769	0.952	0.739	0.939

company image was high at 4.29 or in other words respondents agreed company image was high due to the ability of the company meets customer demand, produce good quality products and services. Company image is found important in heightening industrial competition [47] especially for serving customers who are critically sensitive toward quality and avoiding moral hazard suppliers [52]. Table 2 shows that in all farm sizes, the number of customers experiencing disappointment in feed purchase was larger (64.52%) compared to those who never had (35.48%). Moreover, disappointment increases along the farm size, with 60.52% (>0–11,500 hens), 70.83% (11,501–50,000), and 82.35% (>50,000 hens). Feed takes an important role in achieving economic business goals through its contribution to livestock productivity and as major determinant of goods sold cost [93–95].

Opinion leader effect on perceived product quality was supported with  $\beta = 0.157$ ;  $p \leq 0.05$ . This finding showed evidence that farmers follow the recommendations of individuals who are considered as an expert in the industry [31,57]. The vast networking and knowledge of opinion leaders [95] make them worth considering by farmers in product selection, reducing product risk [96]. In feed industry, opinion leaders have important roles in

**Table 5:** Structural model result

Relationship	Hypothesis	Overall model, $n = 155$	
		$B$	$p$ value
Feed certification → perceived product quality	H <sub>1</sub>	0.127	0.057
Opinion leader → perceived product quality	H <sub>2</sub>	0.157	0.039
Company image → perceived product quality	H <sub>3</sub>	0.690	0.000
Perceived product quality → customer trust	H <sub>4</sub>	0.699	0.000
Perceived product quality → customer satisfaction	H <sub>5</sub>	0.689	0.000
Customer trust → customer loyalty	H <sub>6</sub>	0.507	0.000
Customer satisfaction → customer loyalty	H <sub>7</sub>	0.414	0.000

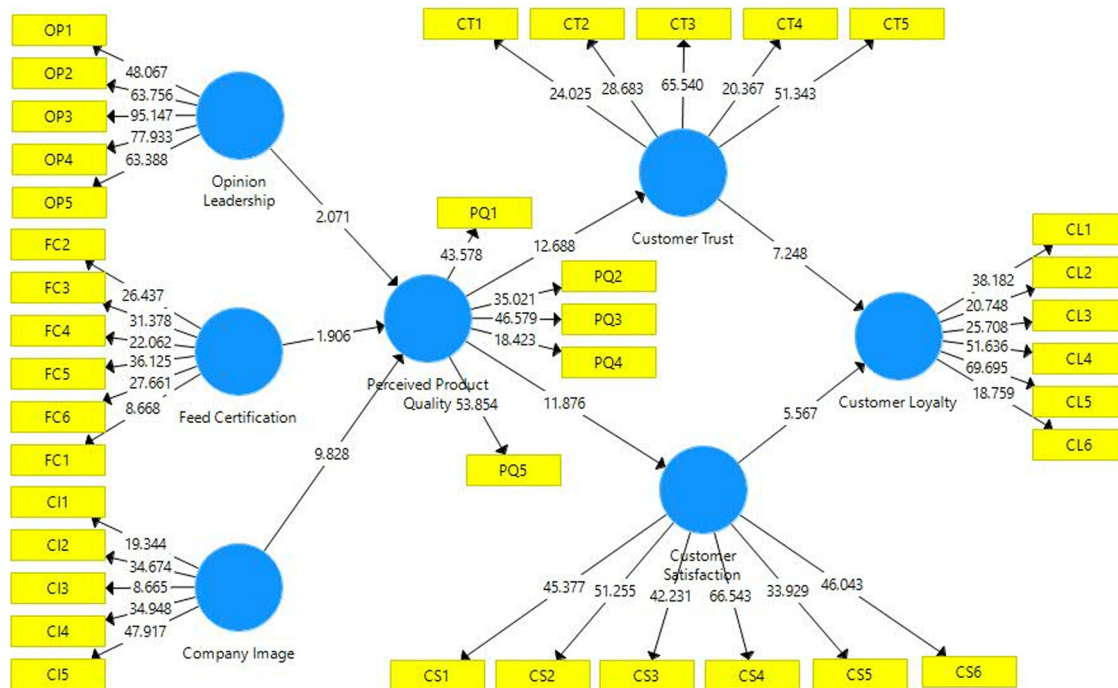


Figure 1: Measurement and structural model analysis.

influencing perceived product quality, because feed contains nutrition that has intangible characteristics. This research found that large-scale farmers (>100,000 hens) considered the role of opinion leader was higher than other scales of layer farms, which was 4.43 compared to 4.17 (<1,000 hens), 4.19 (1,000–11,500 hens), 4.12 (11,500–50,000 hens) and 4.2 (50,000–100,000 hens). Increasing risk on large-scale farmers might force farmers to consider opinion leaders as good deeds and hones to give information [96].

Perceived product quality determines the business's success or failure and influences the product and service acceptance rate for business organization [65]. This research found influence of perceived product quality on customer trust and customer satisfaction were meaningful, with coefficient  $\beta = 0.699$  ( $p < 0.05$ ) and  $\beta = 0.689$  ( $p < 0.05$ ), respectively, and this result is similar to ref. [62] that explained perceived product quality reduces product failure risk, and eventually it is increasing customer trust and customer satisfaction. This result is consistent with previous several studies that showed perceived product quality affect positively on customer trust [63–66] and customer satisfaction [32,67–69].

Finally, the result reveals that mean average of customer trust and satisfaction were 4.20 and 3.89. These results indicate that feed mills were successful in serving their customers. Feed mills have met requirements of feed

quality and security, product guarantee, and farm productivity achievement such as egg production that is reflected in FCR. Then, hypothesis analysis showed that customer trust and satisfaction meaningfully contributed in building customer loyalty. This result is consistent with previous studies that explain customer trust and satisfaction affect customer loyalty [21,65,71–73,74,97]. This also showed that increasing customer loyalty can be attained through the mechanism of customer trust in reducing product quality uncertainty and product failure risk [37].

According to ref. [28], showed not in every country, feed certification regulated as feed mill's commitment, although internationally accepted certification is required for feed mills to penetrate regional or international markets. A study of halal food [98] showed that feed is the preliminary control point of food supply chain; hence, it must use certified halal feed as the source of halal food products. It was emphasized that all halal feed additives used must not cause harm to human health. Furthermore, in organic certification, feed mills experience difficulties to fulfill the requirements of producing certified feed products because organic regulations mainly followed pure organic concept, while raw materials' availability is limited. This study suggested that organic certification regulations must be revisited with an integrative approach, by involving all stakeholders' participation in the industry



such as farmers, technicians, feed industry, certification authority, and policymakers [45]. Compared to those other studies of feed certification, while other works focused on production operations, this study offers an understanding of the role of certification to determine customer loyalty in poultry feed industry.

## 5 Conclusion

This research was conducted to study the role of feed certification, company image, and opinion leader in decision-making of feed purchasing behavior. It can be inferred feed certification, company image, and opinion leader-influenced perceived product quality, but the result showed that company image was the most important factor, followed by opinion leader and the last was feed certification. Then, perceived product quality influenced customer trust and customer satisfaction, and finally, customer trust and satisfaction play important roles to build customer loyalty. This conclusion implied that feed certification influences product perceive quality but the effect is as not big as the company image factor. The importance of feed certification in feed choice to farmers still should be promoted. The Ministry of Agriculture should create a certification logo that can be added to the feed packaging for the feed products that have passed the quality process standard. Furthermore, the government should socialize this certification to farmers as the party who uses feed for the production of food chain. Meanwhile, feed mills in poultry industry should realize that company image is important consideration in feed buying behavior currently. Therefore, apart from carrying out promotional activities of certification, feed mills should focus on maintaining company image. Feed mills should also avoid product performance failure to opinion leaders as their views strongly influence other farmers.

Certification conceptually is an important factor in measuring product quality and our findings cohere with this basic thought, although it was not the largest contribution among other independent variables. Instead of asking if certification matters, our study argues for questions such as “What actions will increase farmers' knowledge and attitude on certification?” and “What factors moderate the influence of feed certification in developing customer loyalty?” These efforts, in turn, have the potential to unlock the payoffs from the certification process and win consumer loyalty. By pursuing these avenues, future researchers can shed further light to explore promotional programs for the farmers and investigate moderating

variables in understanding the influence of certification in feed-buying behavior.

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## References

- [1] Hosain MZ, Kabir SML, Kamal MM. Antimicrobial uses for livestock production in developing countries. *Vet World*. 2021;14(1):210–21. doi: 10.14202/VETWORLD.2021.210-221.
- [2] Pusdatin. Statistics of Food Consumption 2020; 2020.
- [3] Skripnuk DF, Davydenko VA, Romashkina GF, Khuziakmetov RR. Consumer trust in quality and safety of food products in Western Siberia. *Agronomy*. 2021;11(257):1–20.
- [4] Wahyono ND, Utami MMD. A review of the poultry meat production industry for food safety in Indonesia. *J Phys Conf Ser*. 2018;953(1):1–5. doi: 10.1088/1742-6596/953/1/012125.
- [5] Wang EST, Tsai MC. Effects of the perception of traceable fresh food safety and nutrition on perceived health benefits, affective commitment, and repurchase intention. *Food Qual Prefer*. 2019;78(June):1–7. doi: 10.1016/j.foodqual.2019.103723.
- [6] Levyda L, Ratnasari K, Giyatmi G. The practice of food labels on MSMEs. The case study in Bangka Belitung. In *UNiSET 2020: Proceedings of the 1st Universitas Kuningan International Conference on Social Science. Environment and Technology*. 2020; p. 405–409. doi: 10.4108/eai.12-12-2020.2304970.
- [7] Ortega DL, Tschirley DL. Demand for food safety in emerging and developing countries: A research agenda for Asia and Sub-Saharan Africa. *J Agribus Dev Emerg Econ*. 2017;7(1):21–34. doi: 10.1108/JADEE-12-2014-0045.
- [8] Longo JA, Akyoo AM, Sørensen OJ. Awareness and compliance with feed quality standards: the case of chicken feeds in Tanzania. *Afr J Econ Manag Sci*. 2019;10(4):475–92. doi: 10.1108/AJEMS-01-2019-0032.
- [9] Bánáti D. Consumer response to food scandals and scares. *Trends Food Sci Technol*. 2011;22(2–3):56–60. doi: 10.1016/j.tifs.2010.12.007.

- [10] Djukic D, Moracanin SM, Milijasevic M, Babic J, Memisi N, Mandic L. Food safety and food sanitation. *J Hyg Eng Des.* 2016;14:25–31.
- [11] Cully M. The politics of antibiotics. *Nature.* 2014;509:S16–7.
- [12] Vertinsky I, Zhou D. Product and process certification: Systems, regulations, and international marketing strategies. *Int Mark Rev.* 2000;17(3):231–52.
- [13] Choi I. Important distinctions between labels and certifications and why they matters. *Discussions.* 2014;10(3):1–2.
- [14] Pandanwangi K. Pengaruh Sertifikasi Produk, Pemimpin Opini dan Citra Perusahaan terhadap Loyalitas Pelanggan pada Keputusan Pembelian Pakan. Tesis Magister Ilmu Peternakan. Universitas Gadjah Mada, Yogyakarta; 2022.
- [15] Lee M, Lou YC. Consumer reliance on intrinsic and extrinsic cues in product evaluations: A conjoint approach. *JABR.* 2011;12(1):21–9. doi: 10.19030/jabr.v12i1.5833.
- [16] Zeithaml VA. Consumer perceptions of price, quality, and value: A Means-End Model and synthesis of evidence. *J Mark.* 1998;52(July):2–22. doi: 10.1177/002224298805200302.
- [17] Wang J, Tao J, Chu M. Behind the label: Chinese consumers' trust in food certification and the effect of perceived quality on purchase intention. *Food Control.* 2020;108(August):1–10. doi: 10.1016/j.foodcont.2019.106825.
- [18] Brach S, Walsh G, Shaw D. Sustainable consumption and third-party certification labels: Consumers' perceptions and reactions. *Eur Manag J.* 2018;36(2):254–65. doi: 10.1016/j.emj.2017.03.005.
- [19] Prell M, Zanini MT, Caldieraro F, Migueles C. Sustainability certifications and product preference. *Mark Intell Plan.* 2020;38(7):893–906. doi: 10.1108/MIP-12-2019-0616.
- [20] Jun J, Kang J, Hyun SS. Effects of third-party certification on patrons' service quality evaluation in the luxury-restaurant industry. *Br Food J.* 2017;119(4):1–44.
- [21] Carranza R, Díaz E, Martín-Consuegra D. The influence of quality on satisfaction and customer loyalty with an importance-performance map analysis: Exploring the mediating role of trust. *J Hosp Tour Technol.* 2018;9(3):380–96. doi: 10.1108/JHTT-09-2017-0104.
- [22] Park E, Kim KJ. What drives 'customer loyalty'? The role of corporate social responsibility. *Sustain Dev.* 2019;27(3):304–11. doi: 10.1002/sd.1901.
- [23] Mas-Machuca M, Marimon F, Jaca C. The unexplored potential of trust to boost customer loyalty for transport platforms. *Res Transp Bus Manag.* 2021;41:1–10. doi: 10.1016/j.rtbm.2021.100618.
- [24] Venus TJ, Drabik D, Wesseler J. The role of a German multi-stakeholder standard for livestock products derived from non-GMO feed. *Food Policy.* 2018;78(March):58–67. doi: 10.1016/j.foodpol.2018.02.009.
- [25] Nyakudya UN, Nyakudya MN. An investigation into the reasons for and benefits of ISO certification in small manufacturing firms in Botswana. *Open J Bus Manag.* 2022;10(1):942–60. doi: 10.4236/ojbm.2022.102051.
- [26] Mariojouis C, Gouvello RL, Simard F. Feed and feeding in certification schemes of sustainable aquaculture: Human and natural impacts on our seas. *Oceanography Challenges to Future Earth, T. Komatsu.* Switzerland: Springer Nature Swizeerland; 2019. p. 387–97.
- [27] Kaczorowska J, Prandota A, Rejman K, Halicka E, Tul-Krzyszczuk A. Certification labels in shaping perception of food quality—insights from polish and belgian urban consumers. *Sustain.* 2021;13(2):1–22. doi: 10.3390/su13020702.
- [28] Samboko PC, Zulu-mbata O, Chapoto A. Analysis of the animal feed to poultry value chain in Zambia. *Dev South Afr.* 2018;35(3):351–68. doi: 10.1080/0376835X.2018.1480932.
- [29] Garber B, Alwang J, Norton GW, Bovay J. Beef and the bottom line: The effect of value-added certification on feeder cattle profitability. *J Agric Appl Econ.* 2022;54(1):157–74. doi: 10.1017/aae.2021.33.
- [30] Bao T, Chang TLS. Finding disseminators via electronic word of mouth message for effective marketing communications. *Decis Support Syst.* 2014;67:21–9. doi: 10.1016/j.dss.2014.07.006.
- [31] Tobon S, García-Madariaga J. The influence of opinion leaders' ewom on online consumer decisions: A study on social influence. *J Theor Appl Electron Commer Res.* 2021;16(4):748–67. doi: 10.3390/jtaer16040043.
- [32] Nyadzayo MW, Khajehzadeh S. The antecedents of customer loyalty: A moderated mediation model of customer relationship management quality and brand image. *J Retail Consum Serv.* 2016;30:262–70. doi: 10.1016/j.jretconser.2016.02.002.
- [33] Alam MMD, Noor NAM. The relationship between service quality, corporate image, and customer loyalty of generation Y: An application of S-O-R paradigm in the context of superstores in Bangladesh. *SAGE Open.* 2020;10(2):1–19. doi: 10.1177/2158244020924405.
- [34] Susilowati C. Perceived value, eword-of-mouth, traditional word-of-mouth, and perceived quality to destination image of vacation tourists. *Rev Integr Bus Econ Res.* 2018;7(1):312–21.
- [35] Sallam MA. An investigation of corporate image effect on WOM: The role of customer satisfaction and trust. *Int J Bus Adm.* 2016;7(3):27–35. doi: 10.5430/ijba.v7n3p27.
- [36] Yu W, Han X, Ding L, He M. Organic food corporate image and customer co-developing behavior: The mediating role of consumer trust and purchase intention. *J Retail Consum Serv.* 2021;59(April):1–10. doi: 10.1016/j.jretconser.2020.102377.
- [37] Song HJ, Ruan W, Park Y. Effects of service quality, corporate image, and customer trust on the corporate reputation of airlines. *Sustain.* 2019;11(12):1–14. doi: 10.3390/su10023302.
- [38] Grunert KG, Hieke S, Wills J. Sustainability labels on food products: Consumer motivation, understanding and use. *Food Policy.* 2014;44:177–89. doi: 10.1016/j.foodpol.2013.12.001.
- [39] Yin S, Chen M, Xu Y, Chen Y. Chinese consumers' willingness-to-pay for safety label on tomato: Evidence from choice experiments. *China Agric. Econ Rev.* 2017;9(1):141–55. doi: 10.1108/CAER-11-2015-0147.
- [40] Maison D, Marchlewska M, Syarifah D, Zein RA, Purba HP. Explicit versus implicit 'Halal' information: Influence of the halal label and the country-of-origin information on product perceptions in Indonesia. *Front Psychol.* 2018;9:1–7. doi: 10.3389/fpsyg.2018.00382.
- [41] Zhang B, Fu Z, Huang J, Wang J, Xu S, Zhang L. Consumers' perceptions, purchase intention, and willingness to pay a premium price for safe vegetables: A case study of Beijing, China. *J Clean Prod.* 2018;197:1498–507. doi: 10.1016/j.jclepro.2018.06.273.
- [42] Ridha R, Hidayat NK. Impact of innovation & certification to SME performance in F&B Sector. *Conference Series.* 2020;3(1):336–59.

- [43] Muneeza A, Mustapha Z. Halal certification process for fisheries products in Maldives. *J Islam Mark.* 2021;12(2):451–66. doi: 10.1108/JIMA-02-2019-0035.
- [44] Xuan BB. Consumer preference for eco-labelled aquaculture products in Vietnam. *Aquaculture.* 2020;532(June):1–10. doi: 10.1016/j.aquaculture.2020.736111.
- [45] Escribano AJ. Organic feed: A bottleneck for the development of the livestock sector and its transition to sustainability? *Sustain.* 2018;10(7):1–18. doi: 10.3390/su10072393.
- [46] Chatterjee S. Signalling service quality through price and certifications. *Glob Bus Rev.* 2020;21(1):279–93. doi: 10.1177/0972150917749291.
- [47] Konuk FA. The role of store image, perceived quality, trust and perceived value in predicting consumers' purchase intentions towards organic private label food. *J Retail Consum Serv.* 2018;43(March):304–10. doi: 10.1016/j.jretconser.2018.04.011.
- [48] Anam J, Sanuri BMMS, Ismail BLOI. Conceptualizing the relation between halal logo, perceived product quality and the role of consumer knowledge. *J Islam Mark.* 2018;9(4):727–46. doi: 10.1108/JIMA-02-2017-0019.
- [49] Prentice C, Chen J, Wang X. The influence of product and personal attributes on organic food marketing. *J Retail Consum Serv.* 2019;46:70–8. doi: 10.1016/j.jretconser.2017.10.020.
- [50] Branch T, Branch U, Nobar HBK, Rostamzadeh R. The impact of customer satisfaction, customer experience and customer loyalty on brand power. *J Econ Manag.* 2018;19(2):717–430.
- [51] Homburg C, Müller M, Klarmann M. When does salespeople's customer orientation lead to customer loyalty? The differential effects of relational and functional customer orientation. *J Acad Mark Sci.* 2011;39(6):795–812. doi: 10.1007/s11747-010-0220-7.
- [52] Biong H. Choice of subcontractor in markets with asymmetric information: Reputation and price effects. *J Bus Ind Mark.* 2013;28(1):60–71. doi: 10.1108/08858621311285723.
- [53] Shimp T. *Periklanan dan Promosi.* Jakarta: Erlangga; 2003.
- [54] Nunes RH, Ferreira JB, Freitas AS, Ramos FL. The effects of social media opinion leaders' recommendations on followers' intention to buy. *Rev Bras Gest Neg.* 2018;20(1):57–73. doi: 10.7819/rbgn.v20i1.3678.
- [55] Obike KC, Amusa TA, Olowolafe HB. Risk management and determinants of farm output among small scale poultry farmers in Ekiti State, Nigeria. *Agro-Sci (J Trop Agric Food, Env Ext).* 2017;16(2):9–16. doi: 10.4314/as.v16i2.2.
- [56] Kuksov D, Liao C. Opinion leaders and product variety. *Mark Sci.* 2019;38(5):812–34. doi: 10.1287/mksc.2019.1179.
- [57] Iyengar R, Bulte CVD, Valente TW. Opinion leadership and social contagion in a new product diffusion. *Mark Sci.* 2011;30(2):195–212. doi: 10.1287/mksc.1100.0566.
- [58] Styliadis K, Wickman C, Söderberg R. Perceived quality of products: a framework and attributes ranking method. *J Eng Des.* 2020;31(1):37–67. doi: 10.1080/09544828.2019.1669769.
- [59] Aaker DA. *Managing Brand Equity: Capitalizing on the Value of a Brand Name.* New York, London, Toronto, Sydney: The Free Press; 1991.
- [60] Danish RQ, Humayon AA, Iqbal HJ, Raza S, Shahid J. The impact of service quality and service value on customer satisfaction through customer bonding: Evidence from telecommunication sector. *Eur Online J Nat Soc Sci.* 2018;7(1):40–7.
- [61] Aurier P, Lanauze GSD. Impacts of in-store manufacturer brand expression on perceived value, relationship quality and attitudinal loyalty. *Int J Retail Distrib Manag.* 2011;39(11):810–35. doi: 10.1108/09590551111177945.
- [62] Chen YS, Chang CH. Towards green trust: The influences of green perceived quality, green perceived risk, and green satisfaction. *Manag Decis.* 2013;51(1):63–82. doi: 10.1108/00251741311291319.
- [63] Marakanon L, Panjakajornsak V. Perceived quality, perceived risk and customer trust affecting customer loyalty of environmentally friendly electronics products. *Kasetsart J Soc Sci.* 2017;38(1):24–30. doi: 10.1016/j.kjss.2016.08.012.
- [64] Pandey S, Khare A. The role of retailer trust and word of mouth in buying organic foods in an emerging market. *J Food Prod Mark.* 2017;23(8):926–38. doi: 10.1080/10454446.2017.1266543.
- [65] Tuan VK, Rajagopal P. The mediating effect of perceived quality on the customer loyalty in Small and Medium-sized Enterprises (SMEs) in the mobile phone sector in Ho Chi Minh City (HCMC) - Vietnam. *Int J N Technol Res.* 2017;3(11):129–37.
- [66] Gong T, Yi Y. The effect of service quality on customer satisfaction, loyalty, and happiness in five Asian countries. *Psychol Mark.* 2018;35(6):427–42. doi: 10.1002/mar.21096.
- [67] Afthanorhan A, Awang Z, Rashid N, Foziah H, Ghazali PL. Assessing the effects of service quality on customer satisfaction. *Manag Sci Lett.* 2019;9(1):13–24. doi: 10.5267/j.msl.2018.11.004.
- [68] Nguyen N, Leclerc A, LeBlanc G. The mediating role of customer trust on customer loyalty. *J Serv Sci Manag.* 2013;6(1):96–109. doi: 10.4236/jssm.2013.61010.
- [69] Sirdeshmukh D, Singh J, Sabol B. Consumer trust, value, and loyalty in relational exchanges. *J Mark.* 2002;66(1):15–37. doi: 10.1509/jmkg.66.1.15.18449.
- [70] Kotler P, Keller KL, Chernev A. *Marketing Management.* New York: Pearson; 2022.
- [71] Liu WK, Lee YS, Hung LM. The interrelationships among service quality, customer satisfaction, and customer loyalty: Examination of the fast-food industry. *J Foodserv Bus Res.* 2017;20(2):146–62. doi: 10.1080/15378020.2016.1201644.
- [72] Dam SM, Dam TC. Relationship between service quality, brand image, customer satisfaction, and customer loyalty. *J Asian Financ Econ Bus.* 2021;8(3):585–93. doi: 10.13106/jafeb.2021.vol8.no3.0585.
- [73] Assaker G, O'Connor P, El-Haddad R. Examining an integrated model of green image, perceived quality, satisfaction, trust, and loyalty in upscale hotels. *J Hosp Mark Manag.* 2020;29(8):934–55. doi: 10.1080/19368623.2020.1751371.
- [74] Özkan P, Süer S, Keser IK, Kocakoç ID. The effect of service quality and customer satisfaction on customer loyalty: The mediation of perceived value of services, corporate image, and corporate reputation. *Int J Bank Mark.* 2020;38(2):384–405. doi: 10.1108/IJBM-03-2019-0096.
- [75] BPS. *Statistical Yearbook of Indonesia 2022;* 2022.
- [76] Cooper DR, Schindler PS. *Business Research Methods.* 12th edn. New York: McGraw-Hill; 2014.
- [77] Boßow-Thies S, Albers S. Application of PLS in marketing: Content strategies on the internet. *Handbook of Partial Least Squares.* Berlin, Heidelberg: Springer Handbook of Computational Statistics; 2010. p. 1–20.
- [78] Hair JF, Hult GTM, Ringle CM, Sarstedt M. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM).* United States of America: SAGE Publication, Inc; 2017.

- [79] Bagozzi RP, Yi Y. Specification, evaluation, and interpretation of structural equation models. *J Acad Mark Sci.* 2012;40(1):8–34. doi: 10.1007/s11747-011-0278-x.
- [80] Carlson KD, Herdman AO. Understanding the impact of convergent validity on research results. *Organ Res Methods.* 2012;15(1):17–32. doi: 10.1177/1094428110392383.
- [81] Hair JF, Howard MC, Nitzl C. Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *J Bus Res.* 2019;109:101–10. doi: 10.1016/j.jbusres.2019.11.069.
- [82] Wilson B. Using PLS to investigate interaction effects between higher order branding constructs. In: Series Edi VE, Vinzi WW, Chin J, Henseler, Wang H, editors. *Handbook of Partial Least Squares: Concepts, Method and Applications.* Springer; 2010. p. 621–52.
- [83] Ruiz DM, Gremler DD, Washburn JH, Carrion GC. Reframing Customer Value in a Service-Based Paradigm: An Evaluation of a Formative Measure in a Multi-Industry, Cross-Cultural Context,” in *Handbook of Partial Least Squares: Concepts, Methods and Application.* London, New York: Springer-Verlag Berlin Heidelberg; 2010.
- [84] Good V, Calantone RJ. When to outsource the sales force for new products. *Ind Mark Manag.* 2019;82(February):106–16. doi: 10.1016/j.indmarman.2019.02.010.
- [85] Kotler P, Pfoertsch W. Being known or being one of many: the need for brand management for business-to-business (B2B) companies. *J Bus Ind Mark.* 2007;22(6):357–62. doi: 10.1108/08858620710780118.
- [86] Wuyts S, Verhoef PC, Prins R. Partner selection in B2B information service markets. *Int J Res Mark.* 2009;26(1):41–51. doi: 10.1016/j.ijresmar.2008.07.008.
- [87] Manning L, Kowalska A. Considering fraud vulnerability associated with credence-based products such as organic food. *Foods.* 2021;10(8):1–19. doi: 10.3390/foods10081879.
- [88] Wongprawmas R, Canavari M. Consumers’ willingness-to-pay for food safety labels in an emerging market: The case of fresh produce in Thailand. *Food Policy.* 2017;69:25–34. doi: 10.1016/j.foodpol.2017.03.004.
- [89] Maitiniyazi S, Canavari M. Understanding Chinese consumers’ safety perceptions of dairy products: a qualitative study. *Br Food J.* 2021;123(5):1837–52. doi: 10.1108/BFJ-04-2019-0252.
- [90] Dang KTNH, Kohsuwan P. The influence of corporate social responsibility on brand trustworthiness, perceived brand quality, brand attitude and purchase intentions: The case of a leading Vietnamese sausage manufacturer. *Hum Behav Dev Soc.* 2020;21(2):72–80.
- [91] Schimmenti E, Viola E, Funsten C, Borsellino V. The contribution of geographical certification programs to farm income and rural economies: The case of Pecorino Siciliano PDO. *Sustainability.* 2021;13(4):1–32. doi: 10.3390/su13041977.
- [92] Reddy PK, Ankaiah R. A framework of information technology-based agriculture information dissemination system to improve crop productivity. *Curr Sci.* 2005;88(12):1905–13.
- [93] Moss AF, Chrystal PV, Crowley TM, Pesti GM. Raw material nutrient variability has substantial impact on the potential profitability of chicken meat production. *J Appl Poult Res.* 2021;30(1):1–11. doi: 10.1016/j.japr.2020.100129.
- [94] Nagarajan D, Varjani S, Lee DJ, Chang JS. Sustainable aquaculture and animal feed from microalgae – Nutritive value and techno-functional components. *Renew Sustain Energy Rev.* 2021;150(July):1–21. doi: 10.1016/j.rser.2021.111549.
- [95] Keys N, Thomsen DC, Smith TF. Adaptive capacity and climate change: the role of community opinion leaders. *Local Env.* 2016;21(4):432–50. doi: 10.1080/13549839.2014.967758.
- [96] Raghupathi V, Fogel J. The impact of opinion leadership on purchases through social networking websites. *J Theor Appl Electron Commer Res.* 2015;10(3):18–29. doi: 10.4067/S0718-18762015000300003.
- [97] Kim MJ, Park CJ. Does customer delight matter in the customer satisfaction-loyalty linkage? *J Asian Financ Econ Bus.* 2019;6(3):235–45. doi: 10.13106/jafeb.2019.vol6.no3.235.
- [98] Rahim SF, Masood MAB. Global view of animal feed in halal perspective. *GSC Adv Res Rev.* 2022;11(1):37–69. doi: 10.30574/gscarr.2022.11.1.0093.