Factors Affecting Cocoa Pricing in West Pasaman District

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ABSTRACT

The supply chain is a process of decision-making regarding material flow, information flow, and money flow carried out jointly by supply chain actors continuously to fulfill a product into the hands of end consumers. The many actors involved in the supply chain have different interests. The Ministry of Agriculture has issued regulations governing the Marketing of Quality and Cocoa Beans in expected to increase the income of cocoa farmers. In reality, this has not lived up to expectations. So, we expected the government plays a more role in the agro-industrial supply chain system at the legal dimension, namely through a policy on supply chain management. Hence, it is expected to overcome the complexity of the structure of supply chain actors and the uncertainty in the supply chain system, especially in price uncertainty. This study aims to determine the factors that influence cocoa pricing and how significant it affects the agro-industrial supply chain in West Pasaman, West Sumatra. The research method used is descriptive and quantitative research methods using Structural Equation Modeling. The results showed that product availability, product quality, and cocoa marketing system contribute to cocoa price determination at the farmer level but have no significant influence.

Keywords:

Cocoa Supply Chain, Cocoa Pricing

1. Introduction

The concept of supply chain management aims to meet consumer demand, both as raw material for agro-industry and demand for fresh products that are directly consumed. The supply chain is defined as a sequence of decision-making processes regarding the flow of material, information flow, and money flow that are carried out together to fulfill a product into the hands of the final consumer continuously. The final expectation of the process is that goods are produced and distributed in the correct quantity, at the right location, and at the right time in order to minimize costs, the system as a whole, while meeting all needs at every level (Vorst et al., 2007; Pujawan, 2005). ; Simchi-Levi et al., 2000). Supply chain management factors consist of a complex structure of supply chain actors and the uncertainty or risk that occurs in the supply chain (Pujawan, 2005). The supply chain structure describes the role of the parties involved in the supply chain, the flow of information, materials (raw materials and products), and money in the supply chain. The number of actors involved in a supply chain has different and potentially conflicting interests, so the complexity of the supply chain affects decision-making in supply chain management (Manuj et al., 2009; James, 2012). The uncertainty in the supply chain includes the uncertainty of demand, suppliers, and internal. Demand uncertainty such as market risk, uncertainty from suppliers such as *lead time*, raw material prices, quality, and quantity of goods sent, while internal uncertainties such as machine breakdowns, labor conflicts, operational risks, management

risks (Muchfirodin et al., 2014); Guritno et al., 2014; Rohmah et al., 2014; Dewi et al., 2015; Suryaningrat et al., 2015; Dryzmalski, 2012).

Kotler (2008) states that price is the only element of the marketing mix that generates revenue. Other elements generate costs. According to Doyle and Saunders (1995), price is an important variable used by consumers for various reasons, such as economic reasons, which will show that low prices or prices that are always competitive are one of the crucial variables to improve marketing performance. For psychological reasons, price is often considered an indicator of quality. Therefore, pricing is often designed as a sales instrument as well as a powerful instrument of competition.

The agricultural sector, especially the agro-industrial supply chain system, consists of farmers, factories, distributors, retailers, and other stakeholders influenced by economic, environmental, technological, social, and legal dimensions (Vorst, 2004; Ruben et al., 2006). Based on this concept, the governments are expected to play more role in the agro-industrial supply chain system at the legal dimension, namely through a policy on supply chain management. So later, it is expected to overcome the complexity of the structure of supply chain actors and the uncertainty in the supply chain system, especially in price uncertainty.

So far, the government has only set basic prices for various essential commodities. Regarding the prices of agro-industrial commodities, especially those with export values, the government's policy only determines import and export duties. The Minister of Agriculture Regulation No. 67 of 2014, concerning quality requirements and marketing of cocoa beans, aims to increase the competitiveness and added value of Indonesian cocoa beans and increase the income of cocoa farmers. The increase in the revenue of cocoa farmers is the impact of increasing the competitiveness and added value of Indonesian cocoa beans and the development of the domestic cocoa agro-industry. However, we believe that this is not the only factor.

So, it is important to know first the various factors which affect Cocoa pricing in the Cocoa product Supply Chain system before we can evaluate the government policies in improving the welfare of Cocoa farmers and provide recommendations regarding how far the role can be played by the government in making pricing policies. Based on this description, it is the reason why it is necessary to study the factors that influence the pricing of cocoa commodities in West Sumatra. We take one of the largest cocoa producers in West Sumatra for this study, namely the West Pasaman Regency.

1.1 Objectives

This study aims to determine the factors that influence cocoa pricing and how significant it affects in the agro-industrial supply chain in West Pasaman, West Sumatra.

2. Literature Review

Factors that affect prices in the cocoa agro-industry supply chain will shape cocoa price policies in the cocoa agro-industry in West Sumatra. Based on several studies, it is stated that several factors affect the price of cocoa. In generals, according to Randy Schnepf (2005), the general level of an agricultural commodity is influenced by a variety of market forces that can alter the current or expected balance between supply and demand. Many of these forces emanate from domestic food, feed, and industrial-use markets and include consumer preferences and the changing needs of end-users; factors affecting the production processes; relative prices of crops that can substitute in either production or consumption; government policies; and factors affecting storage and transportation. Specifically, for Cocoa prices are described below.

The existing capital system for farmers can affect the availability of products and the quality of cocoa products and ultimately affect the price of cocoa. Ali and Rukka (2011) mention a need for microfinance institutions in cocoa production centers so that farmers can access capital for production costs to create the availability of cocoa products. The ease of accessing capital is also related to increasing cocoa competitiveness by maintaining prices (Harya, GI, 2018). The importance of a capital system through village cooperatives also aims that farmers will no longer borrow capital from collecting traders and are bound by contracts with collector traders to sell their cocoa products at a higher price (Irma et al., 2019).

Back in the great depression of the 1930s, there was a reason behind the leading role in agriculture. The depression affected the entire economy, but it hit farmers particularly hard. It prompted the government to save the agricultural market by producing some regulations, predominantly in pricing policies. Along this side research by Ali and Rukka (2011) states that the government needs to play a role in controlling cocoa distribution channels to achieve marketing efficiency, including in determining cocoa prices. In addition, the government's role in policy deregulation and infrastructure development can also affect cocoa prices (Harya, GI, 2018). The results of Andanari's research (2017) explain the role of the government in providing subsidies for fertilizers or types of pesticides to meet the fermentation standards needed to improve the bargaining position of farmers in cocoa prices.

Supply chain actors in terms of mastery of technology and expertise also significantly affect the quality of cocoa produced and ultimately affect the price of cocoa in the market. In Yani et al. research (2017), farmers must pay attention to the use of technology and control against pests and diseases of cocoa plants to increase cocoa production so that it affects cocoa prices. The same thing was also stated in the research of Rinaldi et al. (2013) that the expertise of farmers as one of the actors in the upstream sector in cocoa agroindustry in terms of doing fermentation is a factor that affects cocoa prices so that it can increase farmers' income.

Another matter stated by Widayat's research (2018) found that the uncertainty of cocoa prices was influenced by the level of cocoa production, in this case, the availability of cocoa. In this study, it is seen that there is a relationship between cocoa export policies that affect the uncertainty of cocoa prices because it will affect the availability of cocoa in Indonesia.

The next factor that affects the price is the quality of cocoa. Andanari's research (2017) states that efforts are needed to improve the quality of Indonesian cocoa beans so that Indonesian cocoa beans have a high bargaining position. Ali and Rukka (2011) also mentioned that improving the quality of cocoa as a price determinant affects the efficiency of cocoa marketing. In Harya's research, GI (2018) states that a price increase reflects the quality and quality of cocoa.

The research by Irma et al. (2019) stated that the marketing system also affects prices because the shorter marketing channels can be profitable and contribute more profit. The same thing is produced in Supristiwendi and Khairuddin (2016); with a marketing system, farmers can take advantage of information about prices and demand to produce according to the expected price level. In general, previous research on price policy in the agro industry supply chain is viewed more from the consumer's point of view, not from the perspective of farmer welfare supply chain entities from upstream, namely farmers to downstream, end consumers in a supply chain system.

3. Methods

The research method to be carried out is descriptive and quantitative research methods. The method used for this research is to use the Structural Equation Modeling (SEM) method with the following stages:

1. The first stage is to formulate a research model based on previous research on factors that influence prices, at this stage previously conducted in the form of a field survey and several literature studies that have been stated in the introduction. Based on this, several variables that allegedly influence cocoa prices in West Sumatra are determined, namely the capital system, the role of the government, supply chain actors of cocoa agroindustry, marketing system, product availability, and product quality. We can read the operational definitions for each variable at table 2.

Based on these variables, a research model can be made as follows:

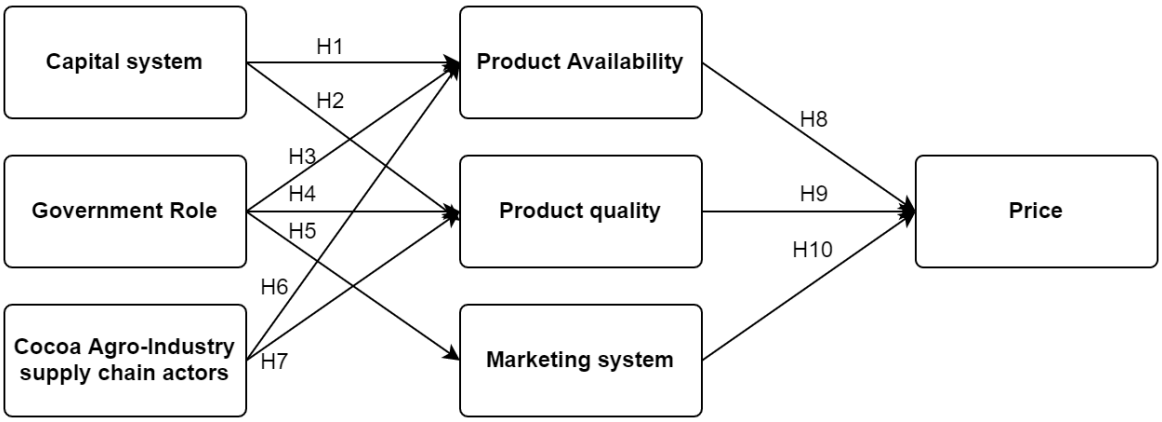

Figure 1. Research Model

Based on the research model, the relationship between the effects of each variable on the price variable will be analyzed. These variables compiled into a hypothesis as see in table 1.

Table 1. Hypothesis

Hypothesis		References
H1	The existing capital system of farmers affects the availability of products	Ali and Rukka, 2011; Harya, GI, 2018; Irma et al., 2019
H2	Existing capital system farmers affect the quality of cocoa products	Andanari, 2017; Harya, GI, 2018
H3	The role of the government affects the availability of cocoa products	Ali and Rukka, 2011; Andanari, 2017
H4	The role of the government affects product quality	Ali and Rukka, 2011, Harya, GI, 2018
H5	The role of the government influences the cocoa marketing system	Ali and Rukka, 2011, Harya, GI, 2018; Andanari, 2017
H6	Actors in the supply chain of cocoa agroindustry affect the quality of cocoa products	Rinaldi et al., 2013, Yani et al., 2017
H7	The supply chain actors of cocoa agroindustry affect the availability of cocoa products	Putra and Arka, 2018; Fandri et al., 2015
H8	Product availability affects the price of cocoa products	Widayat, 2018, Harya, GI, 2018
H9	The quality of cocoa products affects the price of cocoa products	Rinaldi et al., 2013; Widayat, 2018; Andanari, 2017; Stella, 2017
H10	Farmers' marketing system affects the price of cocoa products	Ali and Rukka, 2011; Rinaldi et al., 2013; Supristiwendi and Khairuddin, 2016; Irma et al., 2019

2. The second stage determines the reflective indicators of each variable on the research model
The derivative variables of the research model are shown in Table 2.

Table 2. Derived Variables from Research Model

No	Variables	Definitions	Indicator
1	Capital system (Ali and Rukka, 2011; Harya, GI, 2018; Irma et al, 2019, Andanari, 2017)	This dimension is a latent variable that measures the ability of farmers' capital to meet cocoa production costs.	1. Capital adequacy 2. Capital turnover 3. Sources of financing 4. Land ownership 5. Access to capital assistance
2	Roles government (Ali and Rukka, 2011; Andanari, 2017; Harya, GI, 2018)	This dimension is a latent variable that measures the government's role in cocoa price stability.	1. Infrastructure 2. Assistance program 3. Price control policy
3	Cocoa Agroindustry Supply Chain Actors (Rinaldi et al., 2013, Yani et al., 2017; Putra and Arka, 2018; Fandri et al., 2015)	This dimension is a latent variable that measures the competence of farmers to apply all the methods needed in the cocoa production, processing, and marketing process.	1. Education level 2. Length of experience 3. Cultivation skills 4. Marketing skills 5. Planning skills
4	Product availability (Widayat, 2018; Harya, GI, 2018)	This dimension is a latent variable that measures how much influence is caused by different ways of marketing cocoa	1. Production capacity 2. Demand for raw materials 3. Weather conditions 4. Inventory management
5	Product quality (Rinaldi et al, 2013; Widayat, 2018; Andanari, 2017; Stella, 2017; (Ali and Rukka, 2011)	This dimension is a latent variable that measures farmers' ability to meet requests or demands from buyers	1. Land suitability 2. Seed selection 3. Fertilization 4. Fermentation 5. Treatment 6. Harvest Time
6	Marketing system (Ali and Rukka, 2011; Rinaldi et	This dimension is a latent variable that measures the standard of	1. Marketing chain 2. Marketing options

	al, 2013; Supristiwendi and Khairuddin, 20 16; Irma et al ,2019)	product feasibility produced to be accepted by buyers	3. Bargaining power 4. Marketing institution 5. Marketing strategy
7	Price	This dimension is a latent variable that measures the magnitude of the value caused by the effects of other variables on cocoa prices	1. Marketing system 2. Product quality Product 3. availability 4. Cocoa export prices

3. The third stage then pours the indicators into the form of questions on the research questionnaire.
4. The fourth stage makes a diagram between variables and indicators in Structural Equation Modeling (SEM).
5. The fifth stage of the data collection process on the cocoa agro-industry supply chain actors.
6. The sixth stage of testing the validity and reliability of the instrument, namely determining the validity and reliability of the instrument.
7. The seventh stage of Structural Equation Modeling analysis is carried out on the inner and outer models with the given criteria In Table 3.

Table 3. Tests and Criteria for Outer Model and Inner Model

Test	Criteria for
Outer Model **(test indicators)**	
a. Convergent Validity	a. The *loading factor value of* 0.50 to 0.60 is considered sufficient.
	b. The AVE value must be above 0.50.
b. Discriminant Validity	c. The correlation value *cross-loading* with the latent variable must be greater than the correlation with other latent variables.
c. Reliability	d. The value of *composite reliability* is good if it has a value > 0.70.
	e. value of *Cronbach's Alpha* the good if it has a value> 0.70.
Inner model **(test effect/hypothesis test)**	
R^2 variables *latent* endogenous	a. Results of R^2 of 0.75, 0.50, and 0.25 to indicate that the model of "good," moderate, "weak"

8. The eighth stage of testing hypotheses: Hypothesis testing is done on the causal relationship that has been defined previously about the value significance.
9. The nine stage of analysis and conclusion.

4. Data Collection

Place and Time of Research

This research was conducted in West Pasaman Regency. The selection of the area was carried out by *purposive sampling* where the area was included in the largest cocoa producer in West Sumatra, wherein 2018 West Pasaman Regency produced 8,306 tons of cocoa production from West Sumatra's total production of 58,605 tons (BPS, 2018). The research is conducted in April 2021.

Data Sources and Data Collection Methods

The data used in this study are primary data and secondary data. We collect the Primary data from the sample through interviews. The sample came from Cocoa Farmers. Cocoa farmer samples were taken using *a purposive sampling* technique, with the number of samples determined through calculations using the Taro Yamane formula.

Secondary data was obtained through the relevant parties or agencies, namely the West Sumatra Provincial Plantation Service, the West Sumatra Province Industry Trade and Cooperative Service, BPS, and a literature review.

Research Sample and Population

The total population of farmers in the West Pasaman district is 2,156 farmers (Results of the BPS Sutas of West Sumatra Province, 2018). In determining the sample for a known population, the Taro Yamane formula can be used (Riduwan and Akdon, 2006). From the results of the calculation of the formula with level of confidence = 95%, P = 0.5, and Precision Level = 0.1, it can be taken samples in this study for West Pasaman District 96 farmers.

5. Results and Discussion

5.1 Model Analysis and Hypothesis Testing

The study conducted a model analysis using two evaluation model evaluations, namely assessing the *outer model* or *measurement model* and the *inner model* or *structural model*. *The outer model* or *measurement model* uses tests *convergent validity*, *discriminant validity*, and *composite reliability*. Convergent validity is known through *Loading factor* value and AVE value. Research is said to meet the convergent validity test if it has a *loading factor* above 0.700 and an AVE value greater than 0.5. The test results based on the *loading factor* and AVE for Farmer Entities can be seen in table 4.

Table 4. Results of Testing Validity of Farmer Loading Factor

Variable	Indicator	Loading Factor	*Cut Off*	Description
Capital system	X11	0.721	0.7	Valid
	X12	0.816	0.7	Valid
	X13	0.764	0.7	Valid
	X14	0.706	0.7	Valid
	X15	0771	0.7	Valid
Goverment role	X21	0711	0.7	Valid
	X22	0740	0.7	Valid
	X23	0888	0.7	Valid
Cocoa agro-industry supply chain factors	X31	**0705**	0.7	Valid
	X32	0797	0.7	Valid
	x33	0758	0.7	Valid
	X34	0748	0.7	Valid
	X35	0767	0.7	Valid
Marketing system	Y11	0778	0.7	Valid
	Y12	0.846	0.7	Valid
	Y13	0905	0.7	Valid
	Y14	0.908	0.7	Valid
	Y15	0786	0.7	Valid
Product availability	Y21	0764	0.7	Valid
	Y22	0752	0.7	Valid
	Y23	0747	0.7	Valid
	Y24	0811	0.7	Valid
	Y25	0.820	0.7	Valid
Product quality	Y31	0862	0.7	Valid
	Y32	**0.940**	0.7	Valid
	y33	0853	0.7	Valid
	Y34	0832	0.7	Invalid
	Y35	0822	0.7	Valid
Price	Y41	0840	0.7	Valid
	Y42	0833	0.7	Valid
	Y43	0809	0.7	Valid
	Y44	0778	0.7	Invalid

Based on table 4, it can be It is known that the highest factor loading value is 0.924 (i.e., indicator X13 in the Capital System variable) while the lowest factor loading value is 0.703 (i.e., Y43 indicator in the Product Quality variable). Thus, it can be concluded that all indicators can explain each of the existing variables, and the variables can be said to be valid for further analysis.

Furthermore, to evaluate convergent validity, it can also be seen with the method *Average Variance Extracted* (AVE)for each construct or latent variable. An instrument is said to meet the convergent validity test if it has an *Average Variance Extracted* (AVE) above 0.5 and can be seen in table 5.

Table 5. Results of Farmer Construct Validity Testing Using AVE

	AVE	Limit	Conclusion
Capital system	0.572	0.5	Valid
Cocoa agro-industry supply chain actors	0.571	0.5	Valid
Government role	0.614	0.5	Valid
Marketing system	0.716	0.5	Valid
Price	0.665	0.5	Valid
Product availability	0.607	0.5	Valid
Product quality	0.744	0.5	Valid

Based on table 4, it can be seen that all variables have an *Average Variance Extracted* (AVE) value of more than 0.5. Thus, all indicators can be declared capable of measuring the variables.

5.1.1 *Discriminant Validity Test*

Discriminant validity is calculated using the Fornell-Locker method and *cross-loading,* which aims to determine whether the construct has an adequate discriminant, namely the criteria for the value *loading* of the intended construct must be greater than the value of *loading* with other constructs. Thus, the indicator is declared valid in measuring the appropriate variable.

Table 6. Farmer's Fornel-Locker

	Capital system	*Cocoa agro-industry supply chain actors*	*Government role*	*Marketing system*	*Price*	*Product availability*	*Product quality*
Capital system	0.756						
Cocoa agro-industry supply chain actors	0.685	0.756					
Government role	0.146	0.167	0.783				
Marketing system	0.465	0.516	0.164	0.846			
Price	0.018	-0.094	0.080	0.063	0.815		
Product availability	0.648	0.550	0.065	0.340	0.031	0.779	
Product quality	0.392	0.397	0.047	0.445	-0.043	0.578	0.863

*) the value listed in the diagonal direction is the root value of AVE.

Based on table 5, it can be seen that each construct value in each variable is the highest compared to other variables. So, it can be concluded that all the variables are valid in measuring the corresponding variables. Furthermore, cross-loading discriminant validity testing is carried out, which can be seen in Table 7.

Table 7. Discriminant Validity Test Results *Cross-Loading*

	capital system	*Government role*	*Cocoa agro-industry supply chain actors*	*Marketing system*	*Product availability*	*Product quality*	*Price*
X11	0.3710.310	0.029	0.475		0.392	0.721	0.002
X12	0.309 0.640-0.021	0.048	0.526			0.345	0.816
X13	0.4670.478	0.204		0.429	0.764	0.222	0.049
X14	0.4220.429	0.180		0.241	0.706	0.277	-0.038
X15	0.429 0.463	0.115	0.696		0.771	0.317	0.082
X21	0.146	0.711	0.072	0.089	0.009	0.045	0.055
X22	-0.029	0.740	0.158	0.115	0.011	0.026	0.056
X23	0.194	0.888	0.153	0.163	0.094	0.068	0.030
x31	-0.015	0.131	0.705	0.350	0.477	0.245	0.725
X32	0.1170.389		0.797	0.522	0.470	0.536	-0.004

	capital system	*Government role*	*Cocoa agro-industry supply chain actors*	*Marketing system*	*Product availability*	*Product quality*	*Price*
x33	0.417 0.356 0.289 - 0.208	0.132	0.758				0.366
X34	0.748 0.340-0.021	0.130			0.295	0.195	0.365
X35	0.294-0.118	0.123	0.767		0.426	0.333	0.526
Y11	0.778 0.289	0.183	0.412		0.464	0.346	0.024
Y12	0.846	0.082	0.488	0.344	0.185	0.334	0.040
Y13	0.363	0.115	0.480	0.905	0.290	0.381	0.110
Y14	0.360	0.165	0.425	0.908	0.394	0.457	0.047
Y15	0.786 0.196	0.011	0.357		0.338	0.246	0.027
Y21	0.232 0.530		0.434	0.457	0.764	0.521	-0.081
Y22	-0.016 0.347		0.446	0.274	0.752	0.404	0.120
Y23	-0.0500.352		0.482	0.041	0.747	0.575	0.024
Y24	0.377 0.811	0.042	0.385		0.537	0.565	0.010
Y25	0.3870.820 0.420	0.067		0.220		0.507	0.050
Y31	0.417 0.360 0.640-0.131	0.039				0.862	0.327
Y32	0.346	0.009	0.340	0.940	0.532	0.446	0.015
y33	0.853	0.143	0.244	0.341	0.355	0.289	-0.045
Y34	0.374 0.4350.832	0.079			0.529	0.389	0.036
Y35	-0.056- 0.057		0.296	0.320	0.376	0.822	0.322
Y41	-0.085 - 0.120-0.032 -0.106			0.025		-0.059	0.840
Y42	-0.051	0.096	0.094	0.054	0.024	-0.048	0.833
Y43	-0.014	0.168	-0.062	0.030	0.083	0.006	0.809
Y44	0.044	0.188	-0.06	0.123	0.072	0.079	0.778

Based on table 6, it can be seen that for all variables with each comparison variable has *cross-loading* a more excellent value of the variables compared to the value of *cross-loading* on other variables so that it is concluded that all variables meet the requirements of *discriminant validity*.

5.1.2 *Reliability Test*

The Reliability test can be done by using *Cronbach's alpha* and *composite reliability*. The test criteria state that if the *composite reliability* is more significant than 0.7 and *Cronbach's alpha* is more significant than 0.6, then the construct is declared reliable. For this reason, it can be seen the value of the reliability testing farmers in Table 8.

Table 8. Results of the Reliability Testing of Farmers

	Cronbach's Alpha	Composite Reliability	Conclusion
Capital system	0,814	0,870	Reliable
Cocoa agro-industry supply chain actors	0,813	0,869	Reliable
Government role	0,709	0,825	Reliable
Marketing system	0,907	0,926	Reliable
Price	0,837	0,888	Reliable

Product availability	0,838	0,885	Reliable
Product quality	0,914	0,936	Reliable

Based on table 8, it can be seen that each variable produces the value of *Cronbach's alpha* greater than 0.6 and composite value *reliability* greater than 0.7. Thus, based on calculating the value of *Cronbach's alpha* and the value of *composite reliability,* all dimensions are declared reliable in measuring the variables.

5.1.3 Evaluation *Model Inner*

Evaluation *inner model* or *structural model* is a stage to evaluate the *goodness of fit,* which includes $R^2$and hypothesis testing. The structural model of the research can be seen in Figures 2 and 3.

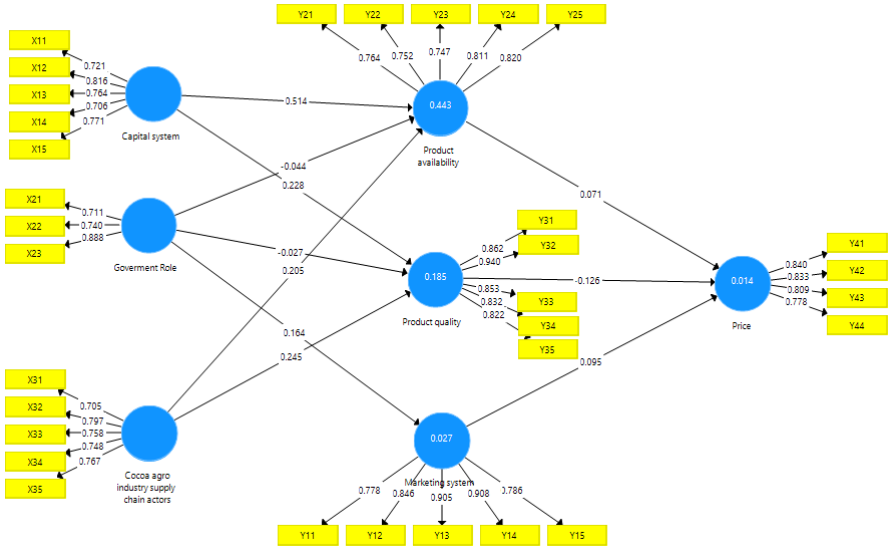

Figure 2. Standardized model

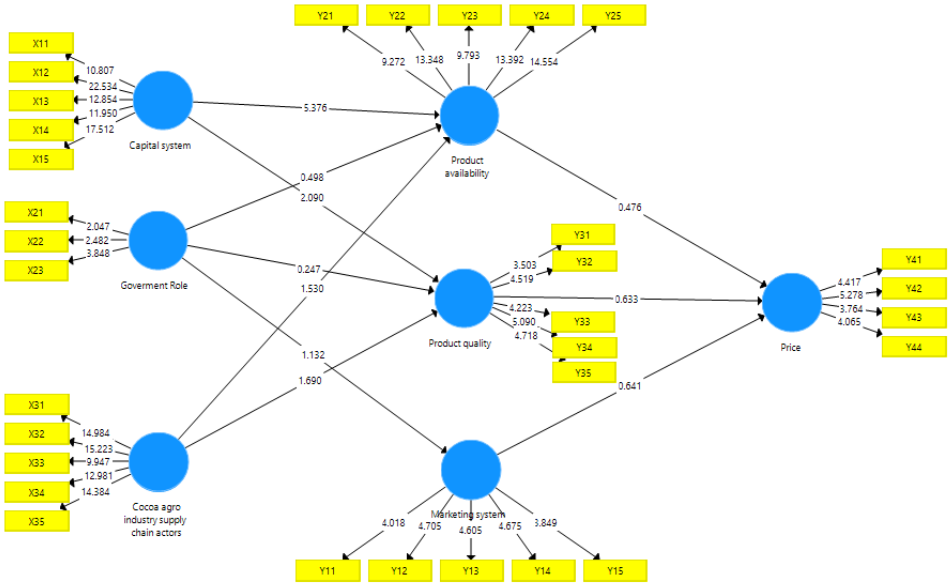

Figure 3. T-value model

Based on the image above, the equation obtained is as follows:

$$Price = (0.071 \times Pa) - (0.126 \times Pq) + (0.0995 \times Ms), Errorvar = 0.986, R^2 = 0.014 \quad (1)$$

$$Pa = (0.205 \times CASCA) - (0.044 \times Gr) + (0.514 \times Cs), Errorvar = 0.443, R^2 = 0.443 \quad (2)$$

$$Pq = (0.245 \times CASCA) - (0.027 \times Gr) + (0.228 \times Cs), Errorvar = 0.815, R^2 = 0.185 \quad (3)$$

$$Ms = (0.164 \times Government\ role), Errorvar = 0.973, R^2 = 0.027 \quad (4)$$

Where

$CASCA = Cocoa\ Agro - industry\ Supply\ Chain\ Actors$
$Pa = Product\ availability$
$Pq = Product\ quality$
$Ms = Marketing\ System$
$Gr = Government\ Role$
$Cs = Capital\ System$

Based on this equation, it can be concluded:

1. R^2 *Price* is = 0.014, meaning that *Price is* influenced by variables *Product availability*, *Product Quality*, and *Marketing system* by 1.4% while the rest is influenced by other factors not examined, which is 0.986 or 98.6%.
   Path coefficient *Product availability* is 0.071 with a positive direction, meaning that there is a unidirectional relationship. If *Product availability* increases by 1 unit, then *Price* will increase by 0.071.
   Path coefficient *Product quality* is -0.126 with a negative direction, meaning that there is a non-unidirectional relationship. If the *product quality* increases by 1 unit, the *price* will decrease by 0.126.
   The coefficient of the path *marketing system* is 0.095 with a positive direction, meaning that there is a unidirectional relationship. If the *Marketing system* increases by 1 unit, then the *Price* will increase by 0.095.
2. R value^2 *Product availability* is 0.443, meaning that *product availability is* influenced by variables *Cocoa agro-industry supply chain actors*, *government roles*, and *capital systems* by 44.3%, while the rest is influenced by other factors not examined, namely 0.557 or 55.7%.
   The path coefficient of *Cocoa agro-industry supply chain actors* is 0.205 with a positive direction, meaning that there is a unidirectional relationship. If *Cocoa agro-industry supply chain actors* increase by 1 unit, then *Product availability* will increase by 0.205.
   The coefficient of the path *Government role* is -0.044 with a negative direction, meaning that there is a non-unidirectional relationship. If the *Government role* increases by 1 unit, then *Product availability* will decrease by 0.044.
   The path coefficient of the *Capital system* is 0.514 with a positive direction, meaning that there is a unidirectional relationship. If the *Capital system* increases by 1 unit, then *Product availability* will increase by 0.514.
3. R value^2 *Product quality* is 0.185, which means that *product quality is* influenced by variables *Cocoa agro-industry supply chain actors*, *Government roles*, and *Capital system* by 18.5%, while the rest is influenced by other factors not examined, which is 0.815 or 81.5%.
   The path coefficient of *Cocoa agro-industry supply chain actors* is 0.245 with a positive direction, meaning that there is a unidirectional relationship. If *Cocoa agro-industry supply chain actors* increase by 1 unit, then *Product quality* will increase by 0.245.
   The coefficient of the path *Government role* is -0.027 with a negative direction, meaning that there is a non-unidirectional relationship. If the *Government role* increases by 1 unit, then the *Product quality* will decrease by 0.027.
   The path coefficient of the *Capital system* is 0.228 with a positive direction, meaning that there is a unidirectional relationship. If the *Capital system* increases by 1 unit, then the *Product quality* will increase by 0.228.
4. R value^2 *the marketing system* is 0.027, meaning that the *marketing system is* influenced by the variable *Government role* by 2.7%, while the rest is influenced by other factors not examined, which is 0.973 or 97.3%.
   The coefficient of the path *Government role* is 0.164 with a positive direction, meaning that there is a unidirectional relationship. If the *Government role* increases by 1 unit, then the *Marketing system* will increase by 0.164.

5.1.4 Hypothesis Testing *Bootstrapping* (*Path Analysis*)

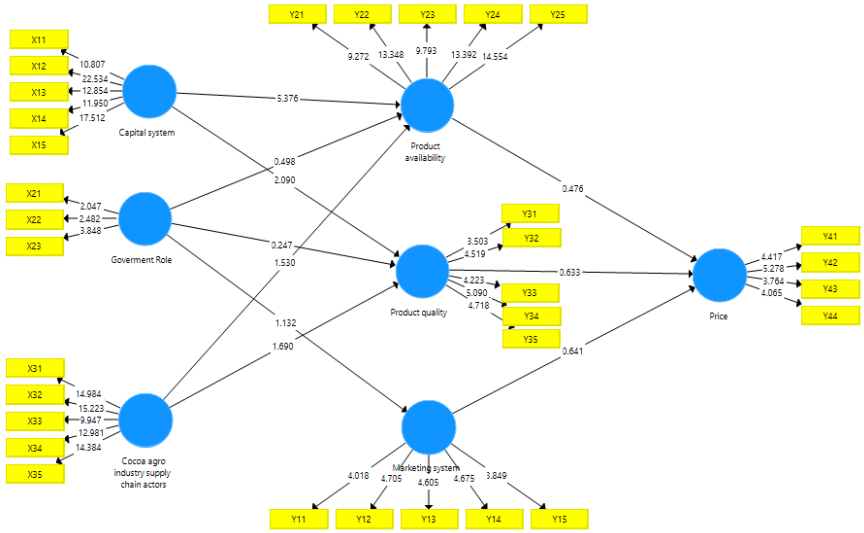

Figure 4. Results *Inner Model*

Hypothesis testing is used to test whether there is an effect of exogenous variables on endogenous variables. The test criteria state that if the T-value statistics T-table (1.96) or the P-*value < significant alpha 5%* or 0.05, there is a significant effect of exogenous variables on endogenous variables. The test results and the significance of the model can be seen in table 9.

Table 9. Hypothesis Testing

Hypothesis		***Original Sample (O)***	***T Statistics (|O/STDEV|)***	***P Values***
H1	Capital System -> Product availability	*0,*514	*5,*376	*0,*000
H2	Capital system -> Product quality	0,228	2,090	0,039
H3	Government role -> Product availability	-0,044	0,498	0,620
H4	Government role -> Product quality	-0,027	0,247	0,805
H5	Government role -> Marketing system	0,164	1,132	0,260
H6	Cocoa agro-industry supply chain actors -> Product quality	0,245	1,690	0,094
H7	Cocoa agro-industry supply chain actors -> Product availability	0,205	1,530	0,129
H8	Product availability -> Price	0,071	0,476	0,635
H9	Product quality -> Price	-0,126	0,633	0,528
H10	Marketing system -> Price	0,095	0,641	0,523

1. **H1: The existing *capital system* on the farmer affects *Product availability.***

In the test results listed in the table above, the path coefficient value of the variable *Capital system* on *Product availability* is 0.514 in a positive direction. This means that there is a unidirectional relationship between the *capital system* and *product availability*. If the *capital system* increases, *product availability* will increase. The P-value is 0.000. Because the value <0.5 means that the *Capital system* has a significant effect on *Product availability.*

2. **H2: The existing *capital system* on the farmer affects cocoa P*roduct quality.***

In the test results listed in the table above, the path coefficient value of the variable *Capital system* on *Product quality* is 0.228 with the direction positive. This means that there is a unidirectional relationship between the *capital system* and *product quality*. If the *capital system* increases, the *product quality* will increase. Its P-value is 0.039. Because the value is < 0.5, the *Capital system* has a significant effect on *Product quality.*

3. **H3: *Government role* affects cocoa *Product availability.***

In the test results listed in the table above, the path coefficient value of the variable *Government role* on *Product availability* is -0.044 in a negative direction. This means that there is a unidirectional relationship between the *Government role* and *Product availability*. If the *Government role* increases, then *Product availability* will decrease. Its P-value is 0.620. Because the value is > 0.5, the *Government role has* no significant effect on *Product availability.*

4. **H4: The *Government role* affects *Product quality***

In the test results listed in the table above, the path coefficient value of the variable *Government role* on *Product quality* is -0.027 with a negative direction. This means that there is a unidirectional relationship between the *Government role* and *Product quality*. If the *Government role* increases, then *Product quality* will decrease. Its P-value is 0.805. Because the value is > 0.5, the *Government role has* no significant effect on *Product quality.*

5. **H5: *Government role* affects the *Marketing system.* Cocoa**

In the test results listed in the table above, the path coefficient value of the variable *Government role* on the *Marketing system* is 0.164 with a positive direction. This means that there is a unidirectional relationship between the *Government role* and the *Marketing system*. If the *Government role* increases, the *Marketing system* will increase. Its P-value is 0.260. Because the value is> 0.5 means the *Government of role* does not significantly influence *system Marketing.*

6. **H6: *Cocoa agro-industry supply chain actors* agro-industry affect the cocoa *product quality* cocoa**

In the test results shown in the table above, the value of the variable path coefficient *Cocoa agro-industry supply chain actors* against *Product quality* is 0.245 with a positive direction. This means that there is a unidirectional relationship between *Cocoa agro-industry supply chain actors* and *Product quality*. If *Cocoa agro-industry supply chain actors* increase, *Product quality* will increase. Its P-value is 0.094. Because the value > 0.5 means that *Cocoa agro-industry supply chain actors have* no significant effect on *Product quality*

7. **H7: *Cocoa agro-industry supply chain actors* cocoa agroindustry affects *Product availability of* cocoa**

In the test results listed in the table above, the path coefficient value of the variable *Cocoa agroindustry supply chain actors* on *product availability* is 0.205 with a positive direction. This means that there is a unidirectional relationship between *Cocoa agro-industry supply chain actors* and *Product availability*. If *Cocoa agro-industry supply chain actors* increase, then *Product availability* will increase. Its P-value is 0.129. Because the value is > 0.5, it means that *Cocoa agro-industry supply chain actors have* no significant effect on *Product availability.*

8. **H8: *Product availability* affects the *price* of cocoa products.**

In the test results listed in the table above, the path coefficient value of the variable *Product availability* on *Price* is 0.071 with the direction positive. This means that there is a unidirectional relationship between *product availability* and *price*. If *product availability* increases, the *price* will increase. Its P-value is 0.635. Because the value is > 0.5, it means that *Product availability has* no significant effect on *Price.*

9. **H9: *product quality* Cocoa affects the *price* of cocoa products.**

In the test results listed in the table above, the path coefficient value of the variable *Product quality* on *Price* is -0.126 in a negative direction. This means that there is a unidirectional relationship between *product quality* and *price*. If *product quality* increases, the *price* will decrease. The P-value is 0.528. Because the value > 0.5 means that *Product quality has* no significant effect on *Price.*

10. **H10: *The marketing system* carried out by farmers affects the *price* of cocoa products**

In the test results listed in the table above, the path coefficient value of the variable *Marketing system* on *Price* is 0.095 with the direction positive. This means that there is a unidirectional relationship between the *Marketing system* and *Price*. If the *Marketing system* increases, the *Price* will increase. Its P-value is 0.523. Because the value is > 0.5, it means that the *Marketing system has* no significant effect on *Price.*

6. Conclusion

The results of this study indicate that all the variables tested are valid and reliable. Then product availability, product quality, and cocoa marketing system do not have a significant influence on price determination at the farmer level.

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