Development Prospect of Pinogu Coffeein Bone Bolango Regency, Gorontalo, Indonesia

[*1]Basir Noho, [2]Soemarno, [2]Mangku Purnomo, [2]Abdul Wahib Muhaimin

*[*1]Graduate Student of Agriculture, Faculty of Agriculture, Brawijaya University, Malang, Indonesia*
[2]Faculty of Agriculture, Faculty of Agriculture, Brawijaya University, Malang, Indonesia

Keywords
Pinogu Coffee; SEM-PLS; Sustainability; Bone Bolango; Community Empowerment

ABSTRACT

Pinogu coffee isuses the nameof PinoguDistrict in Bone BolangoRegency, Gorontalo Province whichhasinterestingin naturalconditions. Itisinterestingbecauseitbelongs to the eastern part of Indonesia, where two tectonicplates collide between the EurasianPlate and the Pacific Ocean Plate from the east. Thisresearchwasconducted on. Analyzing the role of localgovernments in the sustainabledevelopment of Pinogucoffee.Thisstudyuses a technical and social aspectapproachusing the SEM (Structural Equation Modeling) method. The availability of Pinogu coffee islimited and difficult to find. Locallyithasnotmet market demand so that the role of localgovernmentsisneeded in the development of Pinogu Coffee. Thereis no concept/design of quality promotion of Pinogu coffee (design, existingconcept) so that the role and strategy of the government in the governance of pre-and post-harvestPinogu Coffee farminghas a big influence on itsdevelopment.

1. Introduction

Indonesian coffee has become a national mainstay commodity which is quite global as an export commodity because it has a distinctive taste for the international market. Coffee is one of the plantation commodities that has a high economic value compared to other plantation crops and plays an important role as a source of foreign exchange for the country. Coffee not only plays an important role as a source of foreign exchange but is also a source of income for no less than one and a half million coffee farmers in Indonesia (Rahardjo, 2012).

In the aspect of international trade, coffee is the most important commodity in the world and is cultivated in many countries, one of which is Indonesia (Wulandari, 2010; Kanaka and Chinadurai, 2012). Coffee is also a commodity Indonesian plantation with the sixth largest production volume after oil palm, rubber, coconut, sugar cane, and cocoa. The high coffee production places Indonesia as the third largest coffee producer in the world and is included in the four largest coffee suppliers in the world along with Brazil, Colombia, and Vietnam (Wulandari, 2010). Indonesian coffee is traded in the form of coffee beans, roasted coffee, ground coffee, instant coffee, and other food ingredients containing coffee (Rismunandar et al, 2001).

The development of coffee in Indonesia experienced a fairly rapid increase in production, in 2007 coffee production reached around 676.5 thousand tons and in 2013 coffee production was around 691.16 thousand tons. So that coffee production in Indonesia from 2007-2013 has increased by around 2.17% (Central Bureau of Statistics, 2015). The success of coffee agribusiness requires the support of all parties involved in the production process of coffee processing and marketing of coffee commodities. Efforts to increase the productivity and quality of coffee continue to be carried out so that coffee competitiveness in Indonesia can compete in the world market (Rahardjo, 2012).

With the prospect of coffee internationally and nationally being potential, in the current Regional Medium-Term Development Plan (RPJMD) for 2016-2021, Pinogu coffee, which

is called the robusta type, is a regional superior product so that it is encouraged as a prima donna commodity that must be maintained in terms of product quality and uniqueness. its taste by providing product protection through the Intellectual Property Rights (IPR) of Geographical Indications as regulated in Law Number 19 of 2016 concerning Marks and Geographical Indications.

Pinogu coffee is quite specific because it uses the name Pinogu sub-district and is one of the sub-districts in Bone Bolango Regency, Gorontalo province which has interesting natural conditions. Interesting because it belongs to the eastern part of Indonesia, where two tectonic plates collide between the Eurasian Plate and the Pacific Ocean Plate from the east. This condition certainly has many implications for the life that takes place on it. Pinogu is located in the middle of the Tilongkabila mountains in the interior of the forest area of the Bogani Nani Wartabone National Park (Riyaldi: 2017).

Bogani Nani Wartabone National Park area is a conservation area which is also the largest ecosystem buffer area in Gorontalo Province and North Sulawesi Province, as the lungs of the world which has high biodiversity, with a variety of endemic animals and plants to Sulawesi. The territory of this National Park includesGorontalo Province and North Sulawesi Province which were determined through the Decree of the Minister of Forestry in 1992 with an area of 287,115 Ha. The Bogani Nani Wartabone National Park area which is located in the administrative area of Bone Bolango Regency, Gorontalo Province covers an area of ± 110,000 Ha, which was previously a Bone Wildlife Reserve (Mobiliu: 2015). Pinogu Robusta coffee is produced from the Robusta coffee plant which is grown in the Pinogu highlands at an altitude of about 300 to 400 meters above sea level. The Pinogu area is located in the Tilongkabila mountains with red-yellow Alfisol (Mediteran) soil types. This area is an area that has high rainfall, between 1600–2700 mm/year with an average of 2,353.6 mm/year or an average of 196.1 mm/month. Have rainy days between 0-19 rainy days/month with an average of 14 rainy days/month.

Robusta coffee plants in the Pinogu area developed from the early varieties of robusta coffee that entered Pinogu. These varieties have not been identified with certainty until now. Robusta coffee plants are planted under shade plants, which include Dadap plants. The coffee cherries are picked manually after turning into healthy and fresh red logs and carefully selected with a minimum percentage of 95 % of the red pods. The red coffee beans are then processed using the Dry Processing and Honey Processing techniques and dried in the sun until they reach a maximum moisture content of 12%.

Physical quality and taste testing of PinoguRobusta Coffee which was processed using the Dry Processing and Honey Processing technique was carried out in 2015 at the Indonesian Coffee and Cocoa Research Center in Jember on 1 sample of Dry Processed Pinogu Robusta Coffee and 4 samples of Honey Processed Pinogu Robusta Coffee. Complete results of testing 5 samples of Pinogu Robusta Coffee.

2. Methodology

This study uses a technical and social aspect approach using the SEM (Structural Equation Modeling) method. In Anderson and Gerbing, 1988m the philosophical difference between covariance-based SEM and component-based SEM is whether we use structural equation models to test theory or develop theory for predictive purposes. The number of populations used in this study are coffee farmers and non-coffee farmers in Pinogu District, Bone Bolango Regency based on table 3 as many as 17 groups and 396 coffee farmers with purpose sampling technique, namely the determination of respondents who have been determined by researchers based on the ability and understanding of respondents. to this research.

The variable in the study is an attribute or value of an object or activity that has a certain variation to be studied and then drawn conclusions. So, a variable is a concept that has a quantitative or qualitative value whose value can change (Sugiono, 2010). In this study, there are two variables, namely the independent variable, namely the role of the government, and the dependent variable, namely the management of the farm business. The government's role variable consists of several indicators, namely; community guidance (X1), community assistance (X2), economic structure development (X3), capital facilities (X4), and production facilities and infrastructure (X5).

Partial Least Square (PLS) is a statistical method of variance-based SEM designed to solve structural problems involving many variables or many constructs when the sample size of the study is small, there are missing data or missing values and multicollinearity which in previous studies PLS has been tested on real data and in simulations (Gartwaite, 1994; Tenenhaus et al, 2005 in

Abdillah, Willy., and Jogiyanto HM., 2015).

The variance based or component-based approach with PLS orientation shifts from testing quality models to component based predictive models. In this case, PLS defines the latent variable as a linear aggregate according to its indicators. According to Abdillah, Willy., and Jogiyanto HM., 2015, the method of estimating the weight of latent variables is carried out using the inner model, namely the structural model that connects the variables and the outer model, which is the measurement model to produce the specifications. Residual variance in the dependent variable will be minimized to produce the optimum predictive score (R2). PLS analysis is an analytical technique used to answer the problem formulation to test the influence between variables.

The steps in SEM analysis with the PLS method (Yamin, 2011):

1. Inner model
   In the Inner Model, namely designing a structural model of the relationship between latent variables in PLS based on the problem formulation and research hypotheses.
2. Outer model
   In this stage, define and specify the relationship between latent variables and their indicators, whether they are reflective or formulative
3. Path diagram construction
   At this stage the main function of building a path diagram is to visualize the relationship between indicators and their variables and between variables which will make it easier to see the model as a whole.
4. Convert path diagram to system of equations
   Outer relations or the measurement model defines the characteristics of the construct with its manifest variable. Inner model is the specification of the relationship between latent variables, also known as inner relations, which describes the relationship between latent variables based on the substantive theory of research.
5. Estimate
   Parameter estimation (estimation) in the PLS method is the least squares method. In this step, there are three weighting selection schemes in the model estimation process, namely the factor weighting scheme, the centroid weighting scheme, and the path weighting scheme.
6. Evaluation of Goodness of Fit
   This evaluation includes the evaluation of the measurement model and the evaluation of the structural model.
7. Hypothesis test
   Sampling allows the application of distributed free data

Sampling allows the application of distributed free data (distribution free) does not require a large sample. Test done by t-test, if obtained p-value <0.05 (alpha 5%) then concluded significant and vice versa.

3. Result and Discussion

3.1. Validity testing

This The results of processing using SmartPLS can be seen in the table above. The value of the outer model or the correlation between the construct and the variable shows that the overall value of the loading factor on the Agricultural Governance variable (Y) is greater than 0.5, so that the constructs for all Business Governance variables Tani (Y) is already valid from the model.

Table 1. Testing the validity of the Variables of Sustainable Punogu Coffee DevelopmentStrategy (Z)

Indicator	Loading Factor	Information
Z1 <- Pinogu Coffee Sustainable Development Strategy	0.859	Valid
Z2 <- Pinogu Coffee Sustainable Development Strategy	0.709	Valid
Z3 <- Pinogu Coffee Sustainable Development Strategy	0.767	Valid
Z4 <- Pinogu Coffee Sustainable Development Strategy	0.845	Valid
Z5 <- Pinogu Coffee Sustainable Development Strategy	0.847	Valid

The results of processing using SmartPLS can be seen in the table above. The value of the outer model or the correlation between the construct and the variable shows that the overall value of the loading factor variable for the Continuous Punogu Coffee Development Strategy (Z) is greater than 0.5, so the constructs for all variables of the Coffee Development Strategy Punogu Sustainability (Z) is already valid from the model.

3.2. Discriminant Validity Testing (Discriminat Validity)

Table 2. Discriminant Validity Test

Variable	*average variance extracted*

	(AVE)
Government Role (X)	0.559
Farming Governance (Y)	0.613
Sustainable Development Strategy for Pinogu Coffee (Z)	0.652

This test is conducted to see how big the difference between variables is. The value seen in this test is the average variance extracted (AVE) value on all variables obtained as an estimation result where the value is > 0.50 so that it can be declared valid.

3.3. Reliability Test

Table 3. Composite validity testing

Variable	*Cronbach's Alpha*	*composite reliability*
Government Role (X)	0.969	0.972
Farming Governance (Y)	0.969	0.972
Sustainable Development Strategy for Pinogu Coffee (Z)	0.865	0.903

Based on the table above, it can be concluded that the construct for the Management variable is all variables meet the reliable criteria. This is indicated by the value of Cronbach's Alpha and composite reliability obtained from the estimation results of SmartPLS. The resulting value is > 0.70 as recommended criteria.

3.4. Structural Model (Inner Model)

Testing of the inner model or structural model is carried out to see the relationship between the construct, significance value and R-square of the research model. The structural model was evaluated using R-square for the dependent construct of the t-test and the significance of the coefficients of the structural path parameters.

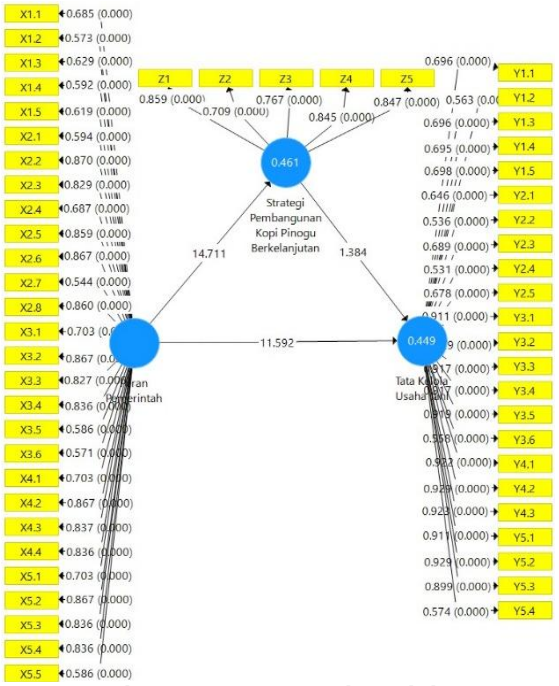

Figure 1. Structural Model

In assessing the model with PLS, it begins by looking at the R-square for each dependent latent variable. Table 9 is the result of R-square estimation using SmartPLS.

Table 4. Value of R Square

Variable	R Square
Farming Governance (Y)	0.449
Sustainable Development Strategy for Pinogu Coffee (Z)	0.461

In principle, this study uses 2 variables that are influenced by other variables, namely the Farmer Business Governance variable (Y) which is influenced by the Government Role variable (X) and the Sustainable Development Strategy for Pinogu Coffee (Z) and variables variableSustainable Pinogu Coffee Development Strategy (Z) which is influenced by the variable Government Role (X). Table 9 shows the R-square value for the variable Farming Governance (Y) obtained at 0.449. These results indicate that 44.9% of the Agricultural Business Governance variable (Y) can be influenced by the Government Role variable (X) and the variableSustainable Development Strategy for Pinogu Coffee (Z). Then on the variableStrategy Sustainable Development of Pinogu Coffee (Z) obtained an R-square value of 0.461. This resultshows that 46.1% of the variableSustainable Development Strategy for Pinogu Coffee (Z) can be influenced by the variable Government Role

(X).

3.5. Hypothesis test

The significance of the estimated parameters provides useful information about the relationship between the research variables. The basis used in testing the hypothesis is the value contained in the output path coefficient. Table 6 provides the estimated output for structural model testing.

Table 5. Path coefficient

	Original Sample (O)	P Values
Government Role (X) → Sustainable Development Strategy for Pinogu Coffee (Z)	0.679	0.000
Sustainable Development Strategy for Pinogu Coffee (Z)→Farming Governance (Y)	0.091	0.167
Government Role (X) → Farming Governance (Y)	0.606	0.000
Government Role (X) → Sustainable Development Strategy for Pinogu Coffee (Z) → Farming Governance (Y)	0.062	0.176

In PLS statistical testing of each hypothesized relationship is carried out using simulation. In this case, the bootstrap method is applied to the sample. Testing with bootstrap is also intended to minimize the problem of abnormal research data. The results of the bootstrapping test from the PLS analysis showed that the Government Role variable (X) had a positive and significant effect onSustainable Development Strategy for Pinogu Coffee (Z) because it has a p-value smaller than 0.05, then The Government Role variable (X) has a positive and significant effect on Farmer Business Governance (Y) because it has a p-value smaller than 0.05.

While the variableSustainable Development Strategy for Pinogu Coffee (Z) does not have a significant effect on the variable Farming Governance (Y) because it has a p-value greater than 0.05. And there is no indirect effect between the government's role on farming governance mediated by the sustainable development strategy of Pinogu Coffee because it has a p-value greater than 0.05.

The summary of the results of hypothesis testing is presented in Table 17. It is known that from the two hypotheses of this study, all hypotheses were accepted.

Table 6. Summary of Hypothesis Testing Results

No	Information	Test result
1	The influence of the government's role on the sustainable development strategy of Pinogu Coffee	Accepted
2	The influence of a sustainable Pinogu Coffee development strategy on farming governance	Rejected
3	The influence of the government's role on the governance of farming	Accepted
4	There is an indirect influence between the government's role on farming governance which is mediated by a sustainable Pinogu Coffee development strategy	Rejected

1. Hypothesis testing 1 (There is an influence of the government's role on the sustainable development strategy of Pinogu Coffee).
   The resultsof testing thefirsthypothesisshowthattherelationshipbetweenthegovernment'srolevariable (X) andthevariableofthesustainabledevelopmentstrategyof Kopi Pinogu (Z) shows a p-valueof 0.000 whichissmallerthan 0.05 soitcanbeconcludedthatthereisaninfluenceofthegovernment'sroleonthesustainabledevelopmentstrategyofPinogu Coffee whichmeansthatitis in accordancewiththefirsthypothesis (hypothesis 1 isaccepted).
2. Testing hypothesis 2 (There is an effect of sustainable Pinogu Coffee development strategy on farming governance).
   The resultsof testing thesecondhypothesisindicatethattherelationshipbetweenthevariablesofthePinogu Coffee developmentstrategyandthe farming managementvariableshows a p-valueof 0.167, whichisgreaterthan 0.05, soitcanbeconcludedthatthereisnoeffectof a sustainablePinogu Coffee developmentstrategyongood farming governance. meansthatitis not in accordancewiththesecondhypothesis (hypothesis 2 isrejected).
3. Hypothesis testing 3 (There is an influence of the government's role on farming governance)

   The resultsof testing thethirdhypothesisindicatethattherelationshipbetweenthevariablesofthegovernment'sroleonthevariableof farming governanceshows a p-valueof 0.000 whichissmallerthan 0.05 soitcanbeconcludedthatthereisaninfluenceofthegovernment'sroleon farming

governancewhichmeansthatitis in accordancewiththethirdhypothesis (hypothesis). 3 accepted).

4. Hypothesis testing 4 (There is an indirect influence between the government's role on farming governance mediated by a sustainable Pinogu Coffee development strategy)

The resultsof testing hypothesis 4 indicatethattherelationshipbetweenthevariables ofthegovernment'sroleonthevariablesof farming governanceandthemoderatingvariableofthesustainablePinogu Coffee developmentstrategyshows a p-valueof 0.176 whichisgreaterthan 0.05 soitcanbeconcludedthatthereisnoindirecteffectbetweenthegovernment'sroleon farming governancemediatedbythesustainabledevelopmentstrategyof Kopi Pinoguwhichmeansitis not in accordancewithhypothesis 4 (hypothesis 4 isrejected).

4. Conclusion

Based on the results and discussion, the conclusions of this study are as follows:
The availability of Pinogu coffee is quite limited and difficult to find. Locally it has not met market demand so that the role of local governments is needed in the development of Pinogu Coffee.

There is no concept/design of quality promotion of Pinogu coffee (design, existing concept) so that the role and strategy of the government in governance of pre- and post-harvest Pinogu Coffee farming has a big influence on its development.

5. References

1. Ali Mobiliu, 2015, *Enchantment of Pinogu Coffee*, Gorontalo, PGRI-Gorontalo Press
2. Rahardjo, P. 2012, *PanduanBudidaya dan PengolahanKopiArabika dan Robusta*, PenebarSwadaya, Jakarta
3. Wulandari, I. S. 2010, *PerbandinganEksporKopi Dua PemasokUtamaDunia Indonesia Dan Brazil: SebuahAnalisis Ekonomi Data Panel 2001-2006,* UNISIA 33 (73): 3-16.
4. Kanaka, S. and M. Chinadurai, 2012, *A Study of comparative advantage of Indian agricultural exports,* Journal of Management and Science 2 (3): 1-9.
5. Rismunandar dan Paimin, 2001, *Kayu Manis Budidaya dan Pengolahan*. PenebarSwadaya, Surabaya
6. Riyaldi, 2017.*BukuPersyaratanIndikasi Geografis Kopi Robusta Pinogu Bone Bolango*, Dinas PerindagkumKabupaten Bone Bolango
7. Sugiyono. 2006, *StatistikaUntukPenelitian*. Penerbit CV Alfabeta. Bandung
8. Badan Pusat Statistik. 2015. http://bps.go.id. Accesssed on May 5th 2020
9. Gartwaite, P. 1992, *An Interpretation of Partial Leasr Squares*, Journal of the American Statistical Association, 89:425, 122-127.
10. Tenenhaus, M. 2005, *PLS Path Modeling*, Computational Statistics and Data Analysis 48 (2005) 159-205.
11. Yamin, Sofyan dan Heri Kurniawan. 2011. *GenerasiBaruMengolah Data Penelitiandengan Partial Least Square Path Modeling: Aplikasidengan Software XLSTAT, SmartPLS, dan Visual PLS*. SalembaInfotek. Jakarta
12. Kankaew, K., Yapanto, L. M., Waramontri, R., Arief, S., Hamsir, Sastrawati, N., & Espinoza-Maguiña, M. R. (2021). Supply chain management and logistic presentation: Mediation effect of competitive advantage. *Uncertain Supply Chain Management*, *9*(2), 255–264. https://doi.org/10.5267/j.uscm.2021.3.007
13. Muhaimin, A. W., &Wijayanti, V. (2019). Analysis of Market Structure, Conduct and Performance of Corn (Zea Mays L.) in Kedung Malang Village, Papar District, Kediri Regency, East Java. *International Journal of Civil Engineering and Technology (IJCIET)*, *10*(June), 10–16. http://www.iaeme.com/ijciet/issues.asp?JType=IJCIET&VType=10&IType=06
14. Yapanto, L. M., Harahab, N., & Musa, D. T. (2021). Alternative income of Tomini Bay Coastal Communities (case study in Bone Bolango District, Gorontalo Province, Indonesia). *IOP Conference Series: Earth and Environmental Science*, *819*(1), 012082. https://doi.org/10.1088/1755-1315/819/1/012082
15. Muhaimin, A. W., &Yapanto, L. M. (2020). *Marketing Strategy based on Analysis of Marketing Mixture on Consumer Purchase Decisions in the Area of Dermo Café Coffee , Malang , Indonesia*. *16174*.
16. Muhaimin, A. W., Toiba, H., Retnoningsih, D., &Yapanto, L. M. (2020). *The Impact of Technology Adoption on Income and Food Security Of Smallholder Cassava Farmers : Empirical Evidence From Indonesia*. *29*(9), 699–706.