Determining Factors of Institutional Management of Downstream Agribusiness Subsystem in Sustainable Rice Food Business Development

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Abstract

One of the essential aspects of improving sustainable rice food business development is management in downstream agribusiness institutions. Previous research has shown that there is still a lack of management and institutional development of sustainable downstream agribusiness subsystems. This research aims to examine the determining factors that affect the performance of the Community Food Business Institute (LUPM) and the Sustainability of the Indonesian Community Food Business Development program (PUPM-TTI). Research location in The Metro City of Lampung Province, Indonesia. This research uses a quantitative approach. The sample number of 292 was taken from 1291 populations based on Krejcie and Morgan table guidelines. Data analysis using K-Means Cluster with SPSS 21 Program and Structure Equation Modeling (SEM) with Smart pls 3.2 Program. Data collection uses in-depth observation and interview methods. The results showed that the variables that most affect the performance of LUPM are social capital and the following sequential participation variables, transaction costs, institutional elements, and human capital. The factors that most affect the Sustainability of the PUMP-TTI program are the following participation variables order of social capital variables, human capital, transaction costs, and institutional elements. All variables have an indirect influence on PUPM-TTI sustainability through LUPM performance.

Keywords: *Social capital, human capital, institutional elements, transaction costs, and participation.*

INTRODUCTION

The productive activities of farmers can not be separated from the institutional Role, both as recipients, implementers, distribution, and development. Institutional activation through government programs with the principle of, by, and for members has been carried out upstream to downstream in the agribusiness subsystem. The development and institutional assistance of agribusiness to realize the independence of farmers and independent institutions (Sinaini et al., 2020). Local farmer institutions play a role in

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implementing government programs related to agricultural development (Sedana et al., 2021).

The lack of competence of farmers is an obstacle to the institutional management of downstream agribusiness. Farmers do not yet own the skills to run a successful business, and small agricultural skip management functions are unclear (Tindiwensi et al., 2020). Farmer organizations as institutions supporting transformation are still very weak (Tan et al., 2021). Small and medium enterprises must implement appropriate managerial tools, including investment in competent human resources, development of flexible strategies, and proper analysis of the surrounding turbulent environment(Dwikat et al., 2023). Disruption in financial access, human resource capabilities, skills and experience triggers hampering the performance of small and medium enterprises and as an alternative this gives birth to strong small and medium enterprises(Wijaya et al., 2023).There are benefits, roles, and functions of institutional existence. Institutional management has been unable to explore, utilize and develop the potential of relevant resources. Institutional management of agribusiness as implementing sustainable agricultural innovation (Hilmiati, 2020).

Government aid programs create dependence and unmanageability for farmers. Institutional management has not received serious attention from the government. Government assistance and programs are essential in stimulating the development of the feasibility and independence of farmers' institutions (Hariance et al., 2021). Grant assistance received by farmers must be accounted for by increased production and increased profitability (Oleynik & Kuban, 2019).

Institutional Sustainability of agribusiness becomes essential as part of agricultural development strategies. However, it is not easy to find an active agribusiness institution and successfully run various programs so that government assistance can be implemented with relevant potential collaboration, namely on human capital, social capital, institutional elements, transaction costs, and member participation. Research results (Prasetyo & Kistanti, 2020) Declare human capital, social capital, institutional economics and entrepreneurship as the main drivers of quality and sustainable economic growth. Small and medium enterprises need to apply the right managerial tools at the company level to improve sustainable performance, including competent human resource investment and flexible strategies and improving sustainable performance (Dwikat et al., 2023). Research objectives: Review the determinants of LUPM performance and Sustainability of PUPM-TTI program management of downstream agribusiness subsystems in the rice food business.

Scientific hypothesis

This research hypothesizes that human capital factors, social capital, institutional elements, transaction costs, and participation affect the performance of LUPM and the Sustainability of the PUPM-TTI program.

MATERIALS AND METHOD

Study area

Metro City's research location is located in the middle of Lampung Province. Agricultural areas dominate the pattern of land use in the Metro City area. The determination of location is intentionally based on the consideration of Metro City, one of the receiving areas of the PUPM-TTI program, and its implementation is spread in the region representing Subdistricts and Villages. Selected 6 LUPM received assistance since 2018, and 4 LUPM have received assistance since 2019. The location of research and rice food business management activities is listed in Figure 1.

Figure 1. Location of Research and Rice Food Business Management Activities

Sample and data collection

This study's subjects (respondents) are administrators and members of 10 PUPM-TTI recipients. The random sampling procedure is simple. Determination of sample size using table guidelines (Krejcie & W.Morgan, 1970), with an error rate of 1% and a confidence level of 95%, the sample number of 292 out of 1291 population. Data collection was carried out in January - February 2021.

Preparation of questionnaires

A questionnaire design is conducted to collect exploratory information from respondents. Questions totalled 3 to 6 per related indicator in this study variable. Respondents are given the freedom to answer with a choice of answers. Information is collected in the form of qualitative and quantitative information. The questionnaire contains legal standard questions because researchers will test and measure and analyze hypotheses. Therefore, the question is made focused and structured in the form of a perceptual assessment of the determinants of LUPM performance and Sustainability of PUPM-TTI. Questions on the questionnaire list are created according to the variables used to test the hypothesis. Categories and scales measuring social capital variables, human capital is 5 = highly fulfilled, 4 = fulfilled, 3 = sufficiently fulfilled, 2 = less fulfilled, and 1 = unfulfilled, and variable transaction costs, participation, LUPM performance, and Sustainability PUPM-TTI is 5 = Very high, 4 = High, 3 = Medium, 2 = Low and 1 = Very low. The indicator variables, definitions, and research parameters used are listed in Table 1.

Table 1. Variables, Indicators, and Research Parameters

Variable Variable	Indicators	Statement	Maximum score
Human capital	Conceptual skills	1. Goals and Objectives LUPM 2. Complete completion of work 3. Entrepreneurial opportunities 4. Communication in management 5. Conflict resolution 6. Solutions, alternatives, ideas, and ideas	25
	Human Skill	1. Stages of work LUPM 2. Goals and Objectives LUPM	25

		3. Outstanding element awards 4. Development motivation LUPM 5. Task understanding, companion direction 6. Operating profit and loss analysis	
	Technical skills	1. Operating machine tools 2. Repairing machine tools 3. Operationalize office equipment 4. Repair office equipment 5. New product management contributions 6. Bookkeeping/financial documents 7. Group business management	25
Social Capital	Social Bonding	1. Assist each other in the completion of work 2. Please help with capital & equipment 3. A sense of mutual kinship, care, and care 4. Mutual respect, respect for fellow officer members and the wider community 5. Frequency of coordination between official and unofficial officers	25
	Social bridging	1. The intensity of interaction within the metro city 2. The intensity of interaction outside the metro city 3. The intensity of interaction between economic institutions in the metro city 4. The intensity of interaction of institutions outside the metro city	25
	Social Linking	1. Kinship, brotherhood in the numbers t LUPM 2. Kinship, brotherhood outside LUPM 3. Maintain internal conflicts and quarrels 4. Maintaining external conflicts and quarrels 5. Working hand in hand to make LUPM a success	20
	Trust	1. Management LUPM 2. Implementation responsibilities LUPM 3. Independence despite no technical guidance LUPM in maintaining rice quality 4. Fight for goals and objectives LUPM	20
	Norm	1. Religious life is intertwined with the group 2. Relationship in the implementation and completion of activities 3. Positive values of togetherness and mutual assistance 4. Management agreements and commitments LUPM	20
Institutional Elements	Yurisdiction	1. Fulfillment of the rights and obligations of Members 2. Fulfillment of duties and functions of the board 3. Contributions of government officials 4. Fulfillment of the rice production process according to requirements 5. Socialization and coaching as needed LUPM	30
	Property Right	1. LUPM Buying grain and selling rice 2. LUPM meets the selling price of grain according to HPP 3. The right of the surrounding community to sell grain di LUPM 4. Partners other than TTI in development Partners other than TTI in development LUPM 5. Community rights as part of Labor	25
	Role of Representation	1. Rules/orderly implementation PUPM-TTI 2. Written rules/rules 3. Rules-based on consensus deliberation	35

		4. Rules are in line with the needs of the implementation of activities 5. The rules have been fulfilled in the implementation 6. Rules and sanctions are always socialized 7. Rules and sanctions that have been agreed upon are enforced	
Cost of pulse, transportation, lungs Transaction cost	Information Search	1. Cost of pulse, transportation, lungs	15
	Coordination	2. Negotiation Fees, Credit Fees, Transport, and Consumption Services	
	Contract Safeguards	3. Socialization Fee, Credit Fee, Transportation	
Participation	What to do when invited to a Regular Meeting	1. Attend because you have to 2. Attend to fulfill the invitation 3. Be present to obtain information without expressing opinions 4. Present to obtain information and express opinions, but opinions are not taken into account 5. Present and give opinions, but only a few opinions are taken into account 6. Attend and receive a proper division of responsibilities 7. Be present and have the authority to make decisions 8. Be present and able to make decisions	8
	In the LUPM meeting conducted related to the preparation of group business plans (RUK)	1. Discuss because you have to 2. Be informed and discuss simply 3. Being informed and not allowed to argue 4. Be informed and may argue but not be taken into account 5. Active, but few discussion results are taken into account 6. Actively discuss and get equal responsibility development 7. Active and have decision-making authority	7
	Involvement in physical activities to increase the capacity of farmers in LUPM	1. Get involved because you have to 2. Just get involved 3. Get involved without getting a chance to pitch ideas 4. Get involved without getting a chance to pitch ideas 5. Involved, but few ideas are taken into account 6. Be involved and have an equal share of responsibilities 7. Involved and have the authority to implement ideas 8. Involved and able to make decisions and able to access outside funds	8
	Willingness to pay dues or donations	1. Pay because you have to 2. Pay and do not have the opportunity to convey the idea of its use 3. Paying will keep a few ideas of fund utilization implemented 4. Pay and have the opportunity to submit ideas, but the idea goes unnoticed 5. Pay and get an equal share of responsibility in the use of funds 6. Pay and have the authority to implement the idea of utilizing funds	7

| | | 7. Pay and have the authority to implement the idea of utilizing funds | |
| | | 8. Pay and be able to make decisions and be able to access outside funds | |

Table 2. Variables, indicators, and categories of performance measurement LUPM

Variable	Indicators	Statement	Categories
Performance LUPM	Input indicators	1. PUPM-TTI assistance is distributed for grain purchase capital and operational costs of rice sales to TTI 2. The availability of rice staple food supply in TTI and partners 3. There is escort assistance and technical guidance to the management and members	1. Not fulfilled 2. Less fulfilled 3. fulfilled 4. Fulfilled 5. Highly fulfilled
	Output Indicator	1. Fostered LUPM target recipients in PUPM-TTI 2. The distribution of rice staple food in TTI as a marketing network for farmers 3. Implementation of mentoring, escorting, the guidance of management and members	1. Not fulfilled 2. Less fulfilled 3. fulfilled 4. Fulfilled 5. Highly fulfilled
	Outcome Indicators	1. Guaranteed purchase price above COGS for farmers 2. Ease of access to food with sales volume in TTI 3. The price of rice food consumers obtain is lower than the market price.	1. Not fulfilled 2. Less fulfilled 3. fulfilled 4. Fulfilled 5. Highly fulfilled

Table 3. Sustainability measurement variables, indicators, and categories

Variable	**Indicators**	**Statement**	**Category**
Economic dimension	The running of economic processes in a sustainable (steady) manner, with stability and growth in rice productivity LUPM	1. Provide prices according to government purchase prices 2. Opening job opportunities 3. Facilitating business units 4. Providing business group benefits and market development of farmer partners	1. Not fulfilled 2. Less fulfilled 3. fulfilled 4. Fulfilled 5. Highly fulfilled
Social dimension	Behaviour involving the participation of self-empowered communities for the development of LUPM	1. Concern for strengthening as a farmer institution, 2. Establish broad public relations 3. Forge partnerships 4. Media management and business implementation at LUPM	1. Not fulfilled 2. Less fulfilled 3. fulfilled 4. Fulfilled 5. Highly fulfilled
Ecological dimensions	Balance of ecosystem functions in supporting natural life of all ecological components LUPM	1. LUPM empathy on productive economic opportunities 2. Media strengthening farmer institutions 3. Business relationship established 4. Partnership linking, group business enhancement	1. Not fulfilled 2. Less fulfilled 3. fulfilled 4. Fulfilled 5. Highly fulfilled

Based on the background, the concept of the research framework is listed in Figure 2.
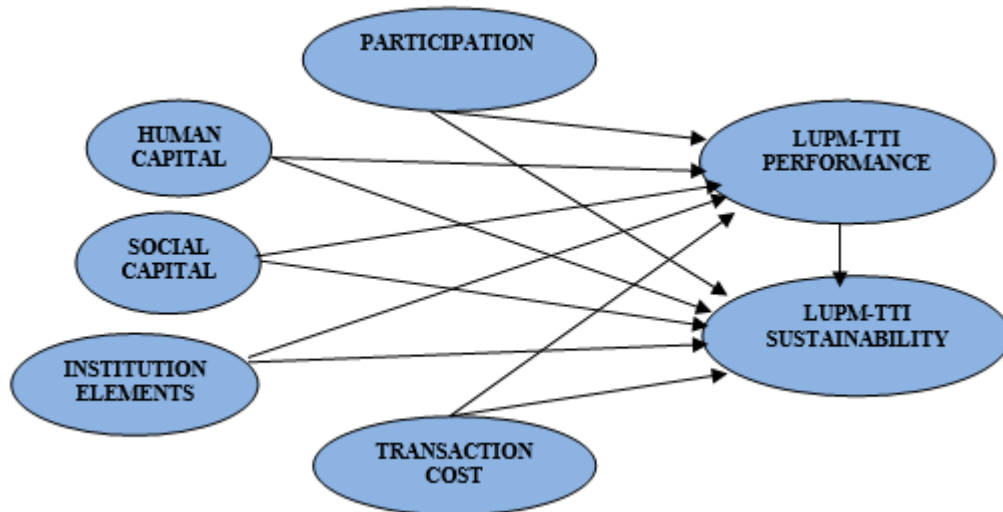
Figure 2. Concept of the framework of determinants of LUPM performance and Sustainability of PUPM-TTI

Based on the concept of the research framework, the following hypotheses:

H0: It is suspected that human capital, social capital, institutional elements, transaction costs, and participation have no significant effect on LUPM performance and PUPM-TTI sustainability.

H1: It is suspected that human capital, social capital, institutional elements, transaction costs, and participation have a significant effect on LUPM performance and PUPM-TTI sustainability.

H0: It is suspected that human capital, social capital, institutional elements, transaction costs, and participation have no significant indirect effect on Sustainability through LUPM performance.

H2: It is suspected that human capital, social capital, institutional elements, transaction costs, and participation have a significant indirect effect on Sustainability through LUPM performance.

Statistical analysis

The study used two statistical analyses. First, the descriptive analysis uses the K-Means Clustering Method with SPSS 25. Second data analysis with Structure Equation Modeling (SEM) with SmartPls 3. 2 to find out the determinants of LUPM Performance and Sustainability of PUPM-TTI. The significance of this study was used at 5%. Value (expected to be less than 0.05 <0.05).

RESEARCH RESULTS AND DISCUSSIONS

Characteristics of Respondents

The study results obtained a description of the age, education level, area of agricultural land, and income of respondents listed in Figure 3.
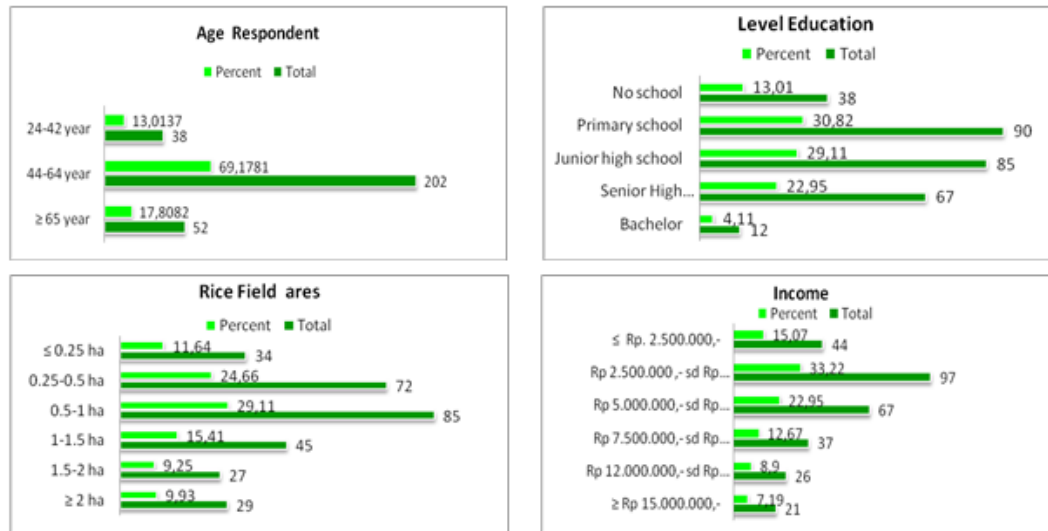
Figure 3. Description of Age, Education Level, Area of Farmland, and Income of Respondents

Based on Figure 3, it is known that most or several 240 respondents (82.19%) are in the composition of productive age. The level of Education of the most respondents at the elementary level is equivalent to 90 people (30.82%), the area of rice fields of the most respondents in the broad range of 0.5-1 Ha amounting to 85 people (29.11%), respondent income per season harvesting technical irrigation fields the most range ≤ Rp 2,500,000-Rp. 5,000,000,- a total of 97 people (33.22%). It can be concluded that respondents in the category of productive age, low level of category education, the area of rice fields of respondents are in the average scale of small-scale category farming, and income sourced from irrigation rice paddy farming business in the low category. The research and data processing results using the K-Means clustering method with SPSS 21 minimum values of 1 and a maximum of five are known. The distribution of research variables is presented in Table 2.

Table 2. Clustering and Distribution of Research Variables Number of Respondent (soul) Percentage

Variable	Cluster										Total	
	1		2		3		4		5			
	Respondent (Soul)	Percentage (%)	Respondent (Soul)	Percentage (%)	Respondent (Soul)	Percentage (%)	Respondent (Soul)	Percentage (%)	Respondent (Soul)	Percentage (%)	Respondent (Soul)	Percentage (%)
Human Capital	12	4,11	79	27,05	39	13,36	82	28,08	80	27,40	292	100
Social Capital	108	36.99	17	5.82	61	20.89	58	19.86	48	16.44	292	100
Institution Elements	20	6,85	70	28,97	58	19,86	137	46,92	7	2,40	292	100
Transaction Cost	258	88,36	6	2,05	18	6,16	1	0,34	9	3,08	292	100
Participation	116	39,73	63	21,58	37	12,67	37	12,67	37	12,67	292	100

Source: Primer Data process, 2021

Based on Table 2, it can be explained that the human capital variables, the most number of respondents, 82 people (28.08%), entered cluster-4. The cluster contains groups of respondents with conceptual skills to meet PUPM-TTI goals and objectives, repair damage to operational equipment, take advantage of entrepreneurial opportunities, communicate well when facing problems, and develop LUPM as a group business. Respondents with human skills can complete work ranging from grain purchases to rice distribution, assess and reward all elements that excel, motivate all elements involved for business development, run and understand the direction of government officers and be

able to make business analysis/bookkeeping and respondents with technical skills can operationalize business operational equipment, office administration, refit office administration equipment, business management, decision making, maintaining group cohesiveness and integrity.

Social capital variables the most respondents; 108 people (36.99%) entered the cluster-1. The cluster contains groups of respondents with social bonding respondents lacking in helping each other complete work, inter-relationship, please help the form of capital, borrowing agricultural equipment and other businesses; this group, there is mutual respect and respect in the internal, wider community and with government officials, lack of frequency of meetings between respondents with government officials in every official invitation and unofficial activities. Respondents with social bridging meet the interaction inside and outside the Metro City area with other agencies and economic institutions. Respondents with social linking meet the relationship of kinship brotherhood, communicate well, and receive with all devices in and outside the LUPM environment while keeping there no conflicts and quarrels inside and outside the internal shoulder-to-shoulder to help each other achieve the target of purchasing grain to farmers / improving marketing networks. Respondents with trust provide stable grain prices and develop and advance the group's business units; PUPM trust can continue to run and provide benefits even though there is no technical guidance from the government, maintaining the quality of grain to produce fresh rice in TTI, continue to fight for the target objectives of PUMP TTI by technical instructions for implementation. Respondents with Norm fulfilling religious life improved institutional roles and functions. Still, they experienced obstacles caused by differences in social status, Education, and work to fulfill the values of positive things such as cooperation, togetherness, commitment, and obedience. In line with research results (Chen et al., 2023), Social norms, social networks, and social engagement positively affect farmer participation.

The institution element variables have the highest number of respondents, 137 people (46.92%) entered in cluster-4; cluster-4 contains respondents meeting the limits of the jurisdiction of obligations to carry out oral or written agreements, the contribution of government officials, administrators, and members in processing and production properly, getting coaching materials provided to managers and members for the management of LUPM and fulfilment of LUPM member rights. Respondents in this group fulfilled the property right of the partner contract/agreement, and LUPM reached the volume of rice distribution to TTI centres and locales and gave the right of the community to receive Labor in the implementation. Fulfilment of representation of the rules by the needs and the existence of rules in the form of agreements and instrument records of rules formed based on deliberation and consensus, imposing sanctions that have been agreed upon and socialized.

Variable transaction fees have the highest number of respondents; 258 people (88.36%) entered cluster-1. This cluster contains respondents' insanity transaction costs on information search, coordination, and securing contracts with low categories. The participation variable had the highest number of respondents; 116 people (39.73%) entered cluster-3. This cluster contains a group of all indicators, including Attendance at the invitation of regular LUPM meetings, activeness in discussions, involvement in physical activities about LUPM, and respondents' lack of willingness to pay dues.

SEM Analysis Results

Research variables include latent variables of human capital, social capital, institutional elements, transaction costs, and participation. Manifest variables include Conceptual skill ($X11$), Human Skill ($X12$) and Technical skill ($X13$), Social Bonding ($X21$), Social Linking ($X22$), Social Bridging ($X23$), Norm ($X24$), Trust ($X25$), JurisdictionAl Limit ($X31$), Property right ($X32$), Role of representation ($X33$) LUPM Information Search cost ($X41$), $X42$ Coordination cost, Contract Security cost ($X43$), Attendance at meetings

(X5.1), group activeness in discussion (X52), Involvement in activities (X53), Willingness to pay dues (X54).

Evaluation of Measurement Model

Convergent validity testing with criteria evaluation of loading factor through the reflective indicator elimination process, next with outer loading ≥ 0.5, then obtained AVE value listed in Table 3.

Table 3. AVE value

Variable	*Average Variance Extracted* (AVE)
Transaction cost	0,812
Sustainability	0,632
Institutional Elements	0,684
Performance	0,826
Human Capital	0,791
Social Capital	0,697
Participation	0,626

Based on Table 3. Convergence validity values have a good correlation between indicators that make up the construct. This is indicated in the AVE value of all variables has a value of ≥ 0.7, meaning meeting convergent validity criteria. Discriminant validity can be seen from the measurement of cross loading factor with construct and AVE comparison with latent variable correlation. Suppose the correlation of the construct with the subject of measurement (each indicator) is more significant than the size of the other construct. In that case, it is said that the variable has high discriminant validity. The cross-loading value is listed in Table 4.

Table 4. Cross Loading

Variable	Human Capital	Social Capital	Institutional Elements	Transaction Cost	Participation	Performance	Sustainability
X11	0.944	0.261	0.064	0.180	0.452	0.406	0.444
X13	0.831	0.221	0.052	0.112	0.295	0.255	0.249
X21	0.255	0.907	0.128	0.221	0.226	0.524	0.391
X22	0.124	0.836	0.186	0.291	0.216	0.515	0.393
X24	0.354	0.840	0.175	0.189	0.298	0.513	0.496
X25	0.140	0.750	0.097	0.208	0.100	0.319	0.236
X31	0.088	0.175	0.883	0.104	0.132	0.286	0.276
X32	0.003	0.125	0.788	0.000	0.144	0.191	0.216
X33	0.062	0.141	0.808	-0.023	0.178	0.220	0.134
X41	0.155	0.207	-0.014	0.874	0.107	0.267	0.288
X42	0.155	0.275	0.083	0.927	0.086	0.396	0.319
X51	0.364	0.259	0.131	0.090	0.804	0.364	0.365
X52	0.298	0.211	0.166	0.095	0.756	0.347	0.302
X54	0.369	0.163	0.128	0.065	0.812	0.361	0.384
Y11	0.353	0.502	0.283	0.327	0.448	0.883	0.443
Y12	0.389	0.542	0.243	0.367	0.420	0.933	0.623
Y13	0.312	0.523	0.261	0.329	0.364	0.911	0.525
Y21	0.324	0.459	0.187	0.306	0.349	0.516	0.826
Y22	0.299	0.334	0.178	0.276	0.301	0.436	0.782
Y23	0.357	0.322	0.263	0.223	0.408	0.446	0.775

The reliabilities test in Partial Least Square (PLS) can use two methods: Composite Reliability (CR) and Cronbach's Alpha, listed in Table 5.

Table 5. Composite Reliability (CR) and Cronbach's Alpha Test Results

Variable	Cronbach's Alpha	Composite Reliability
Transaction Cost	0,772	0,896
Sustainability	0,709	0,837
Institutional Elements	0,773	0,866
Performance	0,895	0,935
Human Capital	0,750	0,883
Social Capital	0,857	0,902
Participation	0,701	0,834

Structural Model Testing (Inner Model))

Bootstrapping results in Figure 4
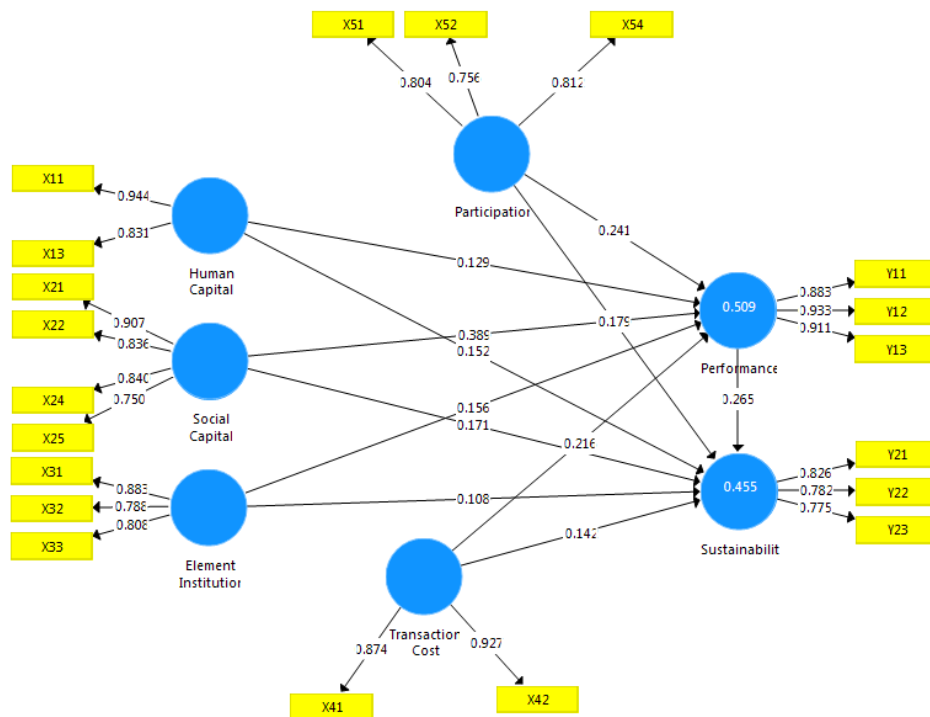
Figure 4. Bootstrapping Results

Furthermore, the R-square value of the LUPM performance variable of 0.509 shows that performance can be explained by 50.9% by the human capital variable (X1). Furthermore, the R-square value of the LUPM performance variable of 0.509 shows that performance can be explained by 50.9% by the human capital variable (X1), social capital (X2), institutional element (X3), transaction costs (X4), and participation (X5). The second substructure of the acquisition of value R_square sustainability variables amounted to 0.455, which shows that PUPM-TTI sustainability can be explained by 45.5% by human capital variables (X1), social capital (X2), institutional elements (X3), transaction costs (X4), participation (X5) and performance (Y1). Based on the results of the analysis of the path of the inner equation of the model as follows:

Variabel Modal Manusia

$X_1 = \lambda_{X1.1}.X_{1.1} + \delta_{1.1}$ $\longrightarrow$ $X_1 = 75,506 \, X_{1.1}$

$X_3 = \lambda_{X1.3}.X_{1.3} + \delta_{1.3}$ $\longrightarrow$ $X_3 = 20,23 \, X_{1.3}$

Variabel Modal Sosial

$X_2 = \lambda_{X21}.X_{2.1} + \delta_{2.1}$ $\longrightarrow$ $X_2 = 75,156 \, X_{2.1}$

$X_2 = \lambda_{X22}.X_{2.2} + \delta_{2.2}$ $\longrightarrow$ $X_2 = 34,39 \, X_{2.2}$

$X_2 = \lambda_{X2.4}.X_{2.4} + \delta_{2.4}$ $\longrightarrow$ $X_2 = 44,35 \, X_{2.4}$

$X_2 = \lambda_{X2.5}.X_{2.5} + \delta_{2.5}$ $\longrightarrow$ $X_2 = 23,61 \, X_{2.5}$

Variabel Unsure Lembaga

$X_3 = \lambda_{X3.1}.X_{3.1} + \delta_{3.1}$ $\longrightarrow$ $X_3 = 37,012 \, X_{3.1}$

$X_3 = \lambda_{X3.2}.X_{3.2} + \delta_{3.2}$ $\longrightarrow$ $X_3 = 16,432 \, X_{3.2}$

$X_3 = \lambda_{X3.3}.X_{3.2} + \delta_{3.3}$ $\longrightarrow$ $X_3 = 20,296 \, X_{3.3}$

Variabel biaya transaksi

$X_4 = \lambda_{X4.1}.X_{4.1} + \delta_{4.1}$ $\longrightarrow$ $X_4 = 31,137 \, X_{4.1}$

$X_4 = \lambda_{X4.2}.X_{4.2} + \delta_{4.2}$ $\longrightarrow$ $X_4 = 50,283 \, X_{4.2}$

Variabel partisipasi

$X_5 = \lambda_{X5.1}.X_{5.1} + \delta_{5.1}$ $\longrightarrow$ $X_5 = 27,466 \, X_{5.1}$

$X_5 = \lambda_{X5.2}.X_{5.2} + \delta_{5.2}$ $\longrightarrow$ $X_5 = 17,241 \, X_{5.2}$

$X_5 = \lambda_{X5.4}.X_{5.4} + \delta_{5.4}$ $\longrightarrow$ $X_5 = 27,223 \, X_{5.4}$

Modal Manusia (X1)

$X_1 = \varepsilon_1 = 75,506 \, X_{1.1} + 20,23 X_{1.3}$

Modal Sosial (X2)

$X_2 = \varepsilon_2 = 57,156 \, X_{2.1} + 34,39 X_{2.2} + 44,35 X_{2.4} + 23,61 X_{2.5}$

Unsur Lembaga (X3)

$X3 = \varepsilon_3 = 37,012 \, X_{3.1} + 16.432 \, X_{3.1} + 20,296 \, X_{3.3}$

Partisipasi (X5)

$X_5 = \varepsilon_5 = 27,466 \, X_{5.1} + 17,241 \, X_{5.2} + 27,23 \, X_{5.4}$

Y1 Kinerja

$\eta_1 = \lambda_{Y1.1}.Y_{1.1} + \lambda_{Y1.2}.Y_{1.2} + \lambda_{Y1.3}.Y_{1.3} + \varepsilon$

$\eta_2 = \lambda_{Y2.1}.Y_{2.1} + \lambda_{Y2.2}.Y_{2.2} + \lambda_{Y2.3}.Y_{2.3} + \varepsilon$

$Y_1 = \eta_1 = 43,17 \, Y_{1.1} + 34,10 \, Y_{1.2} + 44,13 \, Y_{1.3} + \varepsilon$

$Y_2 = \eta_2 = 29,15 \, Y_{2.1} + 21.66 \, Y_{2.2} + 20,19 \, Y_{2.3} + \varepsilon$

Persamaan Eksogen Ke Endogen

$\eta_1 = \lambda_{X1}.X_1 + \lambda_{X.2}.X_2 + \lambda_{X.3}.X_3 + \lambda_{X4}.X_4 + \lambda_{X.5}.X_5 + \delta\eta_1$

$\quad = 2,789.X_1 + 7,533 X_2 + 3,452 \, X_3 + 5,153 \, X_4 + 4,38 X_5 + \delta\eta_1$

$\eta_1 = 2,789.\delta_1 + 7,533.\delta_2 + 5,451.\delta_3 + 5,153.\delta_4 + 4,38.\delta_5 + \delta\eta_1$

$\quad = 8111,799136$

$\eta\ 2\ =\lambda_{X\ 1.}X_1\ +\ \lambda_{X.2}\ .\ X_2+\ \lambda_{X.3}\ .\ X_3\ +\ \lambda_{X\ 4.}X_4\ +\ \lambda_{X.5}\ .X_5+\ \delta\eta_2$

$\quad\quad =2,679.X_1\ +\ 1,996X_2\ +\ 2,56\ X_3\ +\ 4,052\ X_4\ +\ 2,85X_5+\ \delta\eta_2$

$\eta\ 2\ =2,679.\delta_1\ +\ 1,996.\delta_2\ +\ 2,56\ .\delta_3\ +\ 4,052\ .\delta_4\ +\ 2,85.\delta_5+\ \delta\eta_2$

$\quad\quad =4031,498241$

Predictive Relevance (Q2)

Q-square measures how well the observation value produced by the model and also the estimation of its parameters. A Q-square value greater than 0 (zero) indicates that the model has a predictive relevance value, while a Q-square value of less than 0 (zero) indicates that the model has no predictive relevance value. To calculate Q2 can be used formula, as follows:

Q2 = 1-(1-R12) (1-R22)

Q2 = 1 – (1-0,509 1-0.455)

Q2 = 0.732

The value of Q2 achieved 0.732 means the value of Q2 above zero provides evidence that the model has Predictive Relevance.

Predictive relevance (Q2) measures how well the observation value produced by the model and its parameter estimation is. The Q2 value reached 0.732 means the Q2 value above zero proves that the model has predictive relevance.

Evaluation of Goodness of Fit

The calculation result obtained the value of RMS Theta of 0.190 > 0.102 and the value of NFI 0.732< 0.9. therefore, based on both assessments, the model does not meet the criteria of the fit model. However, based on the value of SRMR, the value of 0.067< 0.10, then meets the fit model, it can be concluded that the model is fit with the data.

Hypothesis Testing

Hypotheses in this study will be tested using path coefficient values and t values to see if there are significant influences or not. In addition, the results of the path significance test also show the value of the parameter coefficient (original sample). The parameter coefficient shows the significant value of the influence of each research variable listed in Table 6.

Tabel 6. Output Uji Signifikansi Jalur (Path)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Human Capital ➔ Performance	0.129	0.128	0.046	2.789**	0.005
Human Capital ➔ Sustainability	0.152	0.154	0.057	2.679**	0.008
Performance ➔ Social Capital	0.389	0.388	0.052	7.537**	0.000
Sustainable ➔ Social Capital	0.171	0.174	0.086	1.996**	0.047
Institutional Elements ➔ Performance	0.156	0.162	0.045	3.452**	0.001
Institutional Elements ➔Sustainability	0.108	0.110	0.042	2.560**	0.011
Performance ➔ Transaction Cost	0.216	0.216	0.042	5.153**	0.000
Transaction Cost ➔ Sustainability	0.142	0.142	0.035	4.052**	0.000
Participation ➔ Performance	0.241	0.239	0.055	4.384**	0.000
Participation ➔ Sustainability	0.179	0.177	0.063	2.855**	0.004
Performance ➔ Sustainability	0.265	0.263	0.075	3.542**	0.000

Information: **= Significant ☐ 5%

Based on Table 6 of significance tests, it is known that the effect of human capital on the performance of LUPM value t-value 2.789 greater than 1.96, so it can be concluded that Ho was rejected and H1 accepted; this means that there is a significant influence of human capital variables on LUPM performance, having an original sample of 0.129 with a positive direction means that the more fulfilled the ability of respondents in conceptual skills, human skills, and technical skills then LUPM performance increased by 0.129. In line with the grouping of cluster-4 human capital cluster-4, most respondents fulfilled conceptual skills, human skills, and technical skills to support the management of LUPM. Human capital emphasizes human skills and knowledge embedded in the individual. Human capital emphasizes human skills and knowledge embedded in the individual. Based on the results of human capital testing proves indispensable as one of the determinants of performance and Sustainability in the management of LUPM; this reminds us that human capital is an investment for the management and development of LUPM business activities, especially the PUPM-TTI program. In line with the statement (Scafarto, 2016), Human capital directly and positively affects performance. In line with the results of the study (He & Pérez Estébanez, 2023) Human capital affects the performance of small and medium enterprises.

The influence of human capital on Sustainability with a t-value of 2,679 greater than 1.96, so it can be concluded ho in reject and H1 accepted, meaning there is a significant influence of human capital on Sustainability. Human capital variables to PUPM-TTI sustainability have an original sample of 0.152 with a positive direction. The more fulfilled the ability of managers and members in conceptual skills, human skills, and technical skills, the PUPM-TTI sustainability increased by 0.152. Based on the study results, managerial skills are the competence of respondents as determinants of LUPM performance because managerial skills reduce risks at the management level, thus determining PUPM-TTI sustainability. (Jogaratnam, 2018). Human capital knowledge, skills, competencies and attributes contained in individuals relevant to the domestic economic activities of small and medium enterprises (Wijaya et al., 2023)

Based on the study results, managerial skills are the competence of respondents as determinants of LUPM performance because managerial skills reduce risks at the management level, thus determining PUPM-TTI sustainability.The effect of social capital on performance with a t-value of 7,537 greater than 1.96 concluded Ho was rejected and H1 accepted, meaning there was a significant influence of social capital on LUPM performance. The social capital variable to LUPM performance has an original sample of 0.389 with a positive direction meaning that administrators and members increasingly meet social bonding, social bridging, social linking, trust, and norm, then LUPM performance increases by 0.389. In this study, the social capital variables in cluster-1, the most significant percentage of LUPM administrators and members in social bonding, bridging, social linking, trust, and norm support LUPM performance. Social capital is part of the asset in managing LUPM business; the relationships between people and existing social interactions determine the performance of LUPM. In line with the results of previous research, social capital bonding and bridging have a significant positive effect on agricultural entrepreneurship performance.(Atakan & Yercan, 2021; Prakasa, 2018; Rado et al., 2021; Xie et al., 2021). Social capital significantly influences business performance and success (Oluwabusola et al., 2019). Mutual trust and relationships positively impact performance (Lin et al., 2021). Relational ability has a positive and significant impact on performance (Setini et al., 2021).

The influence of social capital on the Sustainability of PUPM-TTI with a t-value of 1,996 greater than 1.96 so that it can be concluded that Ho is rejected and H1 is accepted, meaning that there is a significant influence of social capital on the Sustainability of PUPM-TTI. Social capital variables towards PUPM-TTI sustainability have an original sample of 0.171. A positive direction means that with better social capital, the Sustainability of PUPM-TTI will increase by 0.171. Based on the processing of social

capital data as a determinant of improving LUPM performance and determining the Sustainability of the PUPM-TTI program, social capital is an asset in the management of LUPM. Elemen modal sosial bermanfaat membentuk persepsi petani pada peningkatan pendapatan dan keberlanjutan program pemerintah Social capital elements are useful in shaping farmers' perceptions of increasing income and sustainability of government programs.(Qiu et al., 2021). Social bonding capital interacts with performance in the potentially profitable sustainable economic exchange (Atakan & Yercan, 2021). Social capital components of bonding, bridging, and linking social capital in farmer entrepreneurs play an important role in dealing with vulnerability due to the pandemic (Salman et al., 2021). Social tribal relations indirectly affect economic performance (Zugravu-Soilita et al., 2021). Social capital combines roles, rules, norms, mutually supportive values, mutual benefit of collective action, resulting in measurable performance improvements (Uphoff & Wijayaratna, 2000).

The influence of institutional elements on LUPM performance t-value 3,452 greater than 1.96 concluded Ho rejected and H1 accepted, meaning there is a significant influence of institutional elements on LUPM performance. Institutional element variables to performance have an original sample of 0.156 with a positive direction. The more fulfilled the institutional element, the LUPM performance increased by 0.156. In this study, the institution element variables in cluster-3, the most significant percentage number are met on property rights, jurisdictional limits, and potential representation support LUPM performance and PUPM-TTI sustainability. The influence of institutional elements on the Sustainability of PUPM-TTI value t-value 2,560 greater than 1.96 concluded H1 is accepted, meaning there is a significant influence of institutional elements on the Sustainability of PUPM-TTI. Elements of the institution as factors determine the improvement of LUPM performance. Property rights have a positive impact on financial performance and reduce negative impacts (Wenjian et al., 2020). Institutional rules significantly increase farmers' willingness to work and reinforce positive institutional effects. (Oktarina et al., 2020).

Institutional element variables to the Sustainability of PUPM-TTI have an original sample of 0.108 with a positive direction. The more fulfilled the institutional element, the more the Sustainability of PUPM-TTI will also increase by 0.108. Thus the test results prove that the elements of the institution determine the Sustainability of PUPM-TTI. Boundary jurisdiction management boundaries, property right clarity, and rule of representation are elements of demonstrating achievements for Sustainability (study on conservation management)(Subhan & Lawelle, 2016).

The effect of transaction cost on LUPM performance t-value of 5,153 greater than 1.96 concluded Ho was rejected and H1 accepted, meaning there was a significant effect of transaction costs on LUPM performance. Variable transaction costs to LUPM performance have an original sample of 0.216 with a positive direction. The lower the transaction cost, the lower the performance of LUPM will also increase by 0.216. In this study, the variable transaction costs the largest percentage amount entered in cluster-1. This cluster contains respondents' insanity information search transaction costs, coordination, and security of low-category contracts. Variables Social capital, human capital, elements of institutions with the word 5 = Very fulfilled, 4 = Fulfilled, 3 = Sufficiently fulfilled, 2 = Less fulfilled, and 1 = Unfulfilled. Variable transaction costs, participation, LUPM Performance, and Sustainability of PUPM-TTI with category 5 = Very high, 4 = High, 3 = Medium, 2 = Low, and 1 = Very NowThis cluster contains respondents' insanity information search transaction costs, coordination, and security of low category contracts. Variables Social capital, human capital, elements of institutions with the word 5 = Very fulfilled, 4 = Fulfilled, 3 = Sufficiently fulfilled, 2 = Less fulfilled, and 1 = Unfulfilled. Variable transaction costs, participation, LUPM Performance, and Sustainability of PUPM-TTI with category 5 = Very high, 4 = High, 3 = Medium, 2 = Low, and 1 = Very low

Thus it can be concluded that the low transaction costs of the management of PUPM-TTI determine the performance of LUPM. In line with the study results (Obong et al., 2021), The key to doing business involves decreasing transaction costs, including tangible and intangible costs. The effect of transaction costs on Sustainability with a t-value of 4,052 greater than 1.96 concluded that Ho was rejected and H1 accepted, meaning there was a significant effect of transaction costs on the Sustainability of PUPM-TTI. Variable transaction costs to PUPM-TTI sustainability have an original sample of 0.142. A positive direction means that the lower the transaction cost, the Sustainability of PUPM-TTI increases by 0.142. Based on data testing of information search costs, coordination and security of low category contracts prove to be a determining factor of PUPM-TTI sustainability; low transaction costs reduce the cost burden in LUPM management so that business results are more profitable. In harmony with the expression(Yousuf, 2017), The company must reduce transaction costs to a minimum level to achieve more advantages and competitive advantages.

The influence of participation on the performance of the value t-value was 4,384, greater than 1.96, so it was concluded that Ho was rejected and H1 was accepted, meaning that there was a significant influence on the performance of LUPM. The participation variable to LUPM performance has an original sample of 0.241 with a positive direction meaning that with higher participation, the performance of LUPM increases by 0.241. Participation variables in cluster-5 are the most significant percentage number. This cluster contains respondents with high attendance characteristics in the invitation of regular LUPM meetings, liveliness in discussions, involvement in physical activities about LUPM, and willingness to pay dues. This cluster group supports and influences LUPM performance. Based on the data testing results, it was concluded that participation determines the performance of LUPM activities, and involvement and activeness of members determine and improve LUPM performance. (Anggraini et al., 2019) Stated that there is a real relationship between farmer participation and the PUPM program's success. Regular group meetings affect peasant groups' performance and institutional achievements (Hilmiati, 2020). Farmers participate in joint activities to explore members' interests, benefit socially and economically and achieve relevant performance. (Mino et al., 2018; Sheilla, 2018).

The influence of participation on the Sustainability of PUPM-TTI value t-value 2.855 greater than 1.96, so it concluded that Ho was rejected and H1 accepted, meaning there was a significant influence of participation on PUPM-TTI sustainability. The participation variable for PUPM-TTI sustainability has an original sample of 0.179 with a positive direction meaning that with higher participation, the Sustainability of PUPM-TTI will increase by 0.179. The data test results concluded that participation determines and affects the Sustainability of PUPM-TTI. PUPM-TTI management should be based on the activities, participation, and involvement of managers and their members. Participation rates are generally in actual contact with all dimensions of sustainability levels ecological, economic, social, technology-infrastructure, and institutional dimensions (Ittaqillah et al., 2020). A study of the participation of community members in rural development projects revealed that membership participation in the implementation of the project has implications for the project's Sustainability. (Uche et al., 2019).

The effect of LUPM performance on the Sustainability of PUPM-TTI t-value of 3,542 this value is more significant than 1.96, so it is concluded that Ho was rejected and H1 was accepted, meaning that there is a significant influence on LUPM performance on PUPM-TTI sustainability. The performance variable against Sustainability has an original sample of 0.265 with a positive direction. The better the performance of LUPM, the Sustainability of PUPM-TTI will increase by 0.265. This test proves that achieving LUPM work targets in terms of input, output, and outcome determines Sustainability in the management of PUPM-TTI. (study Sustainability and performance in Operations Management Research) business performance with low production costs, quality

products, and good delivery, the increased volume encourages business sustainability(Magon et al., 2018)

Indirect Influence

Influence of human capital variables, social capital, institutional elements, and transaction costs on Sustainability through performance as the results of SEM output Table 7

Table 7. Indirect Influence

Human Capital   Performance

Variable	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-Statistics (|O/STDEV|)	P Values
Human Capital → Performance → Sustainability PUPM-TTI	0.034	0.033	0.016	2.209**	0.028
Social Capital → performance LUPM → Sustainability PUPM-TTI	0.103	0.102	0.032	3.261**	0.001
Institutional Elements → performance LUPM → Sustainability PUPM-TTI	0.041	0.043	0.018	2.302**	0.022
Transaction cost → performance LUPM → Sustainability PUPM-TTI	0.057	0.057	0.021	2.774**	0.006
Participation → Sustainability LUPM → Sustainability PUPM-TTI	0.064	0.063	0.025	2.603**	0.010

Source: Primary Data Processing Description: **= Significant ☐ 5%

Based on Table 7. The effect of human capital on the Sustainability of PUPM-TTI through LUPM performance value t-value 2,209 greater than 1.96, concluded Ho rejected, and H1 accepted, this means that there is a significant influence of human capital on the Sustainability of PUPM through LUPM performance. Human capital is strongly correlated and essential in integrating agricultural Sustainability (Bazyli et al., 2021).

The influence of social capital on the Sustainability of PUPM-TTI through LUPM performance value t-value 3,261 greater than 1.96, so it is concluded ho rejected, and H1 accepted, meaning there is a significant influence of social capital on the Sustainability of PUPM-TTI through LUPM performance. Social capital and human capital are linked to Sustainability (Garrigos-simon & Botella-carrubi, 2018). Improving agricultural institutional performance requires human resources and human capital, as such factors are essential to account for half of the agricultural economic performance (Bazyli et al., 2021).

The influence of institutional elements on the Sustainability of PUPM-TTI through the performance of LUPM value t-value 2,302 greater than 1.96 concluded Ho rejected and H1 accepted, meaning there is a significant influence of institutional elements on the Sustainability of PUPM-TTI through LUPM performance. Property rights and policy-making institutions tasked with minimizing transaction costs are indispensable in improving performance (Arsyad, 2014). The effect of transaction costs on the Sustainability of PUPM-TTI through LUPM performance of t-value 2,774 greater than 1.96 concluded Ho was rejected, and H1 received, meaning there is a significant effect of transaction costs on PUPM-TTI sustainability through LUPM performance. In the school of transaction fees, an institution emerges and develops to minimize transaction costs to improve economic performance and increase profits (Arsyad, 2014)

The influence of participation on the Sustainability of PUPM-TTI through the performance of LUPM value t-value 2,603 greater than 1.96 concluded H11 received,

meaning there is a significant influence of participation on the Sustainability of PUPM-TTI through performance. Farmer participation improves internal management performance in group development (Hilmiati, 2020; Marhamah & Waluyati, 2020)

CONCLUSION

This research revealed the institutional management of downstream agribusiness subsystems in the sustainable rice food business. The factor that most affected performance was the original sample social capital variable of 0.389, supported by the results of clustering testing in cluster-4 with the most percentage (28.08%). Variables that further affect the original participation of the sample of 0.241 affect the performance of LUPM and PUPM-TTI sustainability supported by the results of clustering testing in cluster-1 with the most percentage (39.73%). Furthermore, the original institutional element variable of the sample 0.156 affects the performance supported by clustering test results in clusters – 4 with the most percentage (46.92%), and transaction cost variables with original samples of 0.216 affect LUPM performance supported by clustering test results in cluster-1 with the most percentage (88.36%) The last human capital variable with an original sample of 0.129 affected LUPM performance supported by clustering test results at cluster-4 percentages the most (28,08%).

Factors that affect the Sustainability of PUPM-TTI are participation variables. Social capital variables, human capital variables, transaction cost variables, and inertia element variables. All variables indirectly affect the Sustainability of the PUPM-TTI program through LUPM performance. The results of this study imply that these factors need to be added in formulating and developing institutional management and policies that aim to encourage institutions to become business units of farmers, incredibly sustainable downstream agribusiness subsets.

The limitations of this study are that researchers have not separated the units studied by administrators and members. The results of these findings may be part of the weakness of this study because it does not yet represent the perception of organizational management of LUPM. The author recommends that the research is more in-depth by separating the units studied in the case of organizational management in farmers' institutions, especially.

Ethical Statement

This article does not contain studies that require an ethical statement.

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