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Coastal Villages and Agricultural Villages; Implementation of a Self-Managed Project Management System in Developing Village Facilities and Infrastructure of Rural Development

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There is still controversy regarding the success of implementing a self-managed project management system in rural infrastructure development, including inconsistencies in the satisfaction (needs) of village communities as users in implementing development. This study evaluates the effectiveness of a self-managed project management system in rural infrastructure development, focusing on the relationship between user satisfaction and the performance of such projects in Southeast Sulawesi, Indonesia. The research, which involved 354 participants from a population of 708, uses secondary data obtained through questionnaires and analyzes it using the Customer Satisfaction Index (CSI) and SEM-AMOS techniques. The findings indicate that the community's satisfaction with infrastructure is only "quite satisfactory," highlighting the significant role of user satisfaction in the success of development projects. The study suggests that key stakeholders, including Village Heads and project managers, should collaborate to improve development management. The research also recommends that the central government refine the process of allocating village funds for infrastructure, ensuring that projects are aligned with community needs and deliver maximum benefits for local economic, social, and cultural activities.

Keywords: Performance, CSI, project management, self-management, satisfaction, facilities and infrastructure, coastal villages.

INTRODUCTION

Project management involves organizing and controlling resources such as people, funds, and materials to achieve project objectives within a set timeframe. Human resources are highlighted as a key factor in this process (Giri, 2019; Teo and Loosemore, 2011; Bresnen and Marshall, 2011). Over time, the development of specialized project management systems has provided a framework for managing expectations, delegating responsibilities, and streamlining procedures, with modern software widely used in project management.

There are several challenges that often lead to infrastructure project failure, such as unclear objectives, budget constraints, poor communication, time management issues, limited skills, lack of structure, inadequate risk management, cash flow issues, and safety issues (Jiang *et al.*, 2022; Azenha *et al.*, 2021). These issues persist even in developed countries, indicating the complexity and pervasive nature of project management difficulties.

Previous studies have highlighted gaps in the application of project management systems to rural infrastructure development. Many studies have shown that the rural development context needs more attention, especially as many countries are increasingly focusing on bridging the

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urban-rural divide. For example, development strategies have shifted from a centralized approach to a more community-driven approach tailored to the specific needs of villages (Asrul *et al.*, 2023; Azenha *et al.*, 2021; Senbeta and Shu, 2019).

Self-management systems, involving community empowerment and collaboration, are emphasized as a model for managing rural infrastructure projects (Thohir *et al.*, 2020). In this model, local communities are actively involved in the planning and implementation of development projects, which helps to increase ownership and sustainability. The concept of empowering local communities and utilizing free labor for village development is an important aspect of this approach, as it can encourage self-reliance and capacity building. This awareness has been carried out quite intensively by several countries such as China (Chen *et al.*, 2018; and Wong *et al.*, 2013), then India (Meena, 2019; Gini, 2019), Afghanistan (Beath *et al.*, 2015), Africa such as Ethiopia (Senbeta and Shu, 2019), Japan (Ito *et al.*, 2019), Egypt (Shaaban, 2019), the Philippines (Labonne, 2013), Nepal (Parajuli *et al.*, 2012), including the Czech Republic (Medonos *et al.*, 2012).

The Indonesian government has significantly increased the village development budget through the Village Fund program, with funding increasing from IDR 20.77 trillion in 2015 to IDR 72 trillion in 2020 (Sumarto, 2020; Ministry of Finance of the Republic of Indonesia (2018). This funding has contributed to reducing the urban-rural gap, as evidenced by the decline in the Gini ratio, from 0.406 in 2013 to 0.381 in 2022 (Gini Ratio Indonesia, 2021). However, challenges remain in the effectiveness of this fund in alleviating poverty and improving infrastructure.

Self-managed projects have empowered local communities by transforming individuals, families, and households into active participants in project implementation (Setyorini and Susilowati, 2019; Antlöv *et al.*, 2016; Sofiyanto *et al.*, 2017; Sari and Abdullah, 2017; Fajri, 2017). This shift has resulted in increased availability of village infrastructure and the quality of jobs, which supports local economic and social activities (Fadli *et al.*, 2020; Diatmika and Purbadharmaja, 2019; Wong *et al.*, 2013).

Several studies have raised concerns about the effectiveness of the self-managed project management system in rural development, particularly regarding its impact on poverty alleviation and the quality of infrastructure projects. For example, Julianto and Jumario (2018) reported that road infrastructure development contributes only 3% to the village economy and poverty reduction. Similarly, studies by Hasibuan *et al.* (2019); Gusti *et al.* (2020); Mukaddas *et al.* (2023); Mukaddas *et al.* (2021) found that the Village Fund program has not significantly impacted poverty alleviation. One of the key obstacles identified is the mismanagement and overlap of programs within the village government, as noted by Madyan *et al.* (2020); Setyorini and Susilowati (2019).

The infrastructure development process is often not in line with the actual needs of the community (Noor and Mursadin, 2021; Chahyadi and Prasetia, 2019; and Chen *et al.*, 2018). Based on the findings of Noor and Mursadin, (2021); Madyan *et al.* (2020); Chahyadi and Prasetia (2019); Chen *et al.* (2018); Asrul *et al.* (2023) further research and re-evaluation of the project management system are needed, with a focus on ensuring that development projects are not only well managed but also aligned with community needs and contribute more effectively to poverty alleviation.

The study aims to assess how well the self-managed project system works in rural infrastructure development, particularly in coastal and agricultural villages in Southeast Sulawesi, Indonesia. Specifically, it evaluates the level of community satisfaction regarding the performance of infrastructure projects that are managed using this system.

MATERIALS AND METHODS

This research was carried out in Konawe Regency, Southeast Sulawesi Province, Indonesia. Taking samples from coastal villages in Kapoiala District, Soropia District, Lalonggasumeeto District, Konawe Regency. The location was chosen deliberately with consideration; 1) Konawe Regency is the region with the largest number of villages and allocation of village funds from the Government, 2). The sample area is close to the center of urban activities (Kendari City as the capital of Southeast Sulawesi Province), and 3) There has never been previous research that has taken the same research topic.

This research uses a quantitative approach, not based (starting) on testing theory, but starting from the process of data collection techniques using a weighting/scoring (numerical) approach and then tabulating statistically. According to Creswell and Creswell, (2018); Creswell (2010);Nasir and Sukmawati, (2023) state that a quantitative (type) approach tries to reveal a social phenomenon in a comprehensive or in-depth manner based on quantitative opinions or perceptions. Quantitative research is research that uses statistical procedures, or any procedure that uses statistical procedures (even if it does not test theory) (Hasddin *et al.*, 2022). The statistical procedures in question are CSI and SEM-AMOS analysis.

A sample of 354 heads of families was taken from a total population of 708 people (heads of families) or around 51% of the total population. The sample consisted of village communities as users, village heads, village officials, and providers of self-management services for the development of village facilities and infrastructure. The details are in Kapoiala District as many as 92 people, Soropia District as many as 140 people, and Lalonggasumeeto District as many as 122 people. This approach refers to Akdon and Riduwan (2009) if the population size is approximately (±) 100, then the sample size is at least 51% of the population size, and if the population size is more than 1,000, then you can take at least 15% of informants (Table 1). This sampling technique is called the quota sampling technique.

The scope of analysis for this research focuses on evaluating the implementation of the self-managed rural facilities and infrastructure development project management system. The analysis uses seven indicators, comprising 42 items, which are detailed in Table 2. The data primarily comes from primary sources, obtained through questionnaires based on the identified variable indicators.

To assess community satisfaction, the Likert scale scoring system is used, adapted from Cooper and Schindler (2006). The scale is operationalized as follows: 1.00 – 1.50: Very Dissatisfied; 1.51 – 2.50: Dissatisfied; 2.51 – 3.50: Quite Satisfied/Neutral; 3.51 – 4.50: Satisfied; and 4.51 – 5.00: Very Satisfied. This scale helps evaluate respondents' satisfaction levels with the performance of the project management system in developing rural infrastructure.

CSI analysis**:** To evaluate the implementation of the project management system for developing village facilities and infrastructure based on community satisfaction, this study uses the Customer Satisfaction Index (CSI) method. The CSI is employed as a tool for analyzing the satisfaction levels of community members as users of the infrastructure projects.

The decision to use the CSI method is supported by prior research, including studies by Chen *et al.*, (2018); Noor and Mursadin (2021); Asrul *et al.*, (2023), who recommended its application in similar contexts. The CSI method provides a systematic approach to quantify community satisfaction and assess the effectiveness of the project management system in meeting the needs of the village community.

The Customer Satisfaction Index (CSI) method is a valuable tool for measuring overall customer satisfaction, as highlighted by Aritonang (2005). By evaluating community satisfaction with the infrastructure development projects, the CSI analysis provides important insights that can guide future improvement efforts (Irawan, 2004).

The stages in conducting CSI analysis are as follows: 1) Determine Mean Importance Score (MIS):

The importance of each factor is assessed to understand how critical each indicator is to the respondents; 2) Determine Mean Satisfaction Score (MSS):

The satisfaction level for each factor is measured, reflecting the respondents' perceptions of how well the project meets their needs; 3) Weight Factors (WF):

Weight factors are assigned to each indicator based on their importance. These weights reflect the relative significance of each factor in the overall satisfaction evaluation; 4) Weight Score (WS):

The weight scores are calculated by multiplying the weight factors by the corresponding satisfaction levels; and 5) Calculate the CSI (Customer Satisfaction Index):

The CSI value is calculated by aggregating the weight scores for all indicators. This index provides a quantitative measure of overall satisfaction.

These steps, as outlined by Rijanto (2014), Darus and Mahalli (2015), Patimah *et al*. (2016); Widodo and Sutopo (2018), allow for a comprehensive assessment of customer satisfaction, which can be used as a reference to determine targets for future development improvements.

Table 1.Satisfaction criteria with the customer satisfaction index (CSI).

No.	Index Value (%)	CSI Criteria
1	81,00-100,00	Very Satisfied
2	66,00-80,99	Satisfied
3	51,00-65,99	Fairly Satisfied

SEM AMOS analysis**:** The analysis of the relationship between satisfaction and performance in the development of village facilities and infrastructure, as part of the project management system implementation, is conducted using SEM-AMOS (Structural Equation Modeling with AMOS software). This analysis helps determine how performance influences community satisfaction in the development of self-managed village facilities and infrastructure.

Confirmatory Factor Analysis (CFA) is employed to validate the dimensions that form the constructs or factors of user satisfaction and performance in infrastructure development. These dimensions, along with their indicators and items, are detailed in Table 2. The CFA ensures that the constructs are accurately defined by assessing their underlying factors.

After confirming the latent variables (the constructs for satisfaction and performance), each construct undergoes testing for validity and reliability to ensure they are defined appropriately and consistently across the data.

Once the latent variables are confirmed, the next step is structural testing using AMOS (Analysis of Moment Structures). This phase involves developing a model that shows the relationships between the constructs, allowing for a clearer understanding of how user satisfaction is influenced by the performance of the infrastructure development process. The results of this analysis, including the relationships between the variables and the structural model, are presented in Tables 5-9 and Figures 3 and 4. These tables and figures provide the detailed findings from the SEM-AMOS analysis, offering a comprehensive view of the interactions between the variables and the constructed model.

RESULTS

Testing research instruments**:** In this study, validation testing is conducted by calculating the correlation coefficient between item scores and total scores at a significance level of 95% (α = 0.05). Since the data is measured using a Likert scale, the product-moment correlation is used for the validity test. An instrument is considered valid if the correlation significance value is ≤ α = 0.05 or if the correlation coefficient (r) is ≥ 0.30, as recommended by Hair *et al.* (2011). For reliability testing, the Cronbach's Alpha (CA) method is employed. The accepted cut-off point for Cronbach's alpha is ≥ 0.60, though this is not an absolute standard, as noted by

Table 2. Validity and reliability test results of the instrument.

Indicator	Items	*r*	*Sig.*	Results	*CA*	Results
Empirical description of facilities and infrastructure [EDI]	Basic village infrastructure has been met [EDI-1]	0,528	0,000	Valid	0,741	Reliable
	Gives a quality impression to all facilities and infrastructure built [EDI-2]	0,573	0,000	Valid		
	Give a good impression in the use of facilities and infrastructure built [EDI-3]	0,519	0,000	Valid		
	The principle of self-management in the village is implemented well [EDI-4]	0,732	0,000	Valid		
	All work plans are carried out well and on time [EDI-5]	0,466	0,000	Valid		
	Using labor from the local area [EDI-6]	0,571	0,000	Valid		
	Raw materials are taken from the local area (local) [EDI-7]	0,530	0,000	Valid		
	Providers/suppliers from the local area [EDI-8]	0,519	0,000	Valid		
	Workers' wages are paid on time according to the provisions (day/week/month) [EDI-9]	0,742	0,000	Valid		
Hope [H]	Hope to improve the quality of life [H-1]	0,724	0,000	Valid	0,717	Reliable
	Hope for increased production [H-2]	0,541	0,000	Valid		
	Hope to improve the environment [H-3]	0,433	0,000	Valid		
	Hope to increase income [H-4]	0,594	0,000	Valid		
	The poor and neglected are involved in village development [H-5]	0,740	0,000	Valid		
	Job opportunities in the village are increasing [H-6]	0,341	0,000	Valid		
Quality [Q]	Taste improves quality of life [Q-1]	0,569	0,000	Valid	0,688	Reliable
	Sense of increased production [Q-2]	0,575	0,000	Valid		
	A sense of improving the environment [Q-3]	0,507	0,000	Valid		
	Sense of increasing income [Q-4]	0,574	0,000	Valid		
	Construction effectiveness and efficiency [Q-5]	0,554	0,000	Valid		
	Development according to standards and quality [Q-6]	0,367	0,000	Valid		
Value [V]	Feel the quality below the given cost [V-1]	0,565	0,000	Valid	0,706	Reliable
	Feeling the cost is below the quality provided [V-2]	0,642	0,000	Valid		
	Increasing the value of facilities and infrastructure services after they are put into operation [V-3]	0,643	0,000	Valid		
Satisfaction (from physical facilities and infrastructure) [SF]	Relative satisfaction with expectations that facilities and infrastructure are met and adequate to support community socio-economic activities [SF-1]	0,672	0,000	Valid	0,734	Reliable
	Relative satisfaction with ideal conditions, in this case by expectations or desired expectations, namely that it can function well, namely safe, comfortable, and reliable [SF-2]	0,631	0,000	Valid		
	Effective (right on target) and efficient (according to existing capabilities and resources) [SF-3]	0,647	0,000	Valid		
Complaint [C]	The village government can accommodate community aspirations regarding development proposals [C-1]	0,530	0,000	Valid	0,795	Reliable
	Complaints to others [C-2]	0,890	0,000	Valid		
	Frequency of hearing complaints [C-3]	0,883	0,000	Valid		
	Complaints to the relevant department [C-4]	0,641	0,000	Valid		
Trust [T]	Possibility of increasing the availability of facilities and infrastructure [T-1]	0,285	0,000	Valid	0,711	Reliable
	Possibility of improving the quality of facilities and infrastructure [T-2]	0,366	0,000	Valid		
	Possibility of improving facilities and infrastructure or improving the quality of work processes [T-3]	0,370	0,000	Valid		
	Possibility of participating in construction [T-4]	0,611	0,000	Valid		
	Possibility of investment and financial participation for work [T-5]	0,472	0,000	Valid		
	Possibility of participating in operation and maintenance [T-6]	0,521	0,000	Valid		
	Possibility of building information transparency by providing good information [T-7]	0,561	0,000	Valid		
	Possibility to listen to people's aspirations [T-8]	0,434	0,000	Valid		
	There may always be a clear project board available for each development activity [T-8]	0,541	0,000	Valid		
	Possibility of procuring goods and services according to regulations and being accountable [T-9]	0,643	0,000	Valid		
	There is probably no corruption [T-10]	0,498	0,000	Valid		

Sekaran (2000). An instrument is considered to have an acceptable level of reliability if the reliability coefficient is ≥ 0.60. Reliability indicates that the instrument consistently measures the variables, yielding the same or similar results when used repeatedly (Hair *et al.*, 2011).

The results of these validity and reliability tests are provided in Table 2, where the specific values for each item and overall instrument reliability are presented for further analysis.

In this research, Cronbach's Alpha (CA) is used for the reliability test. The accepted cut-off point for Cronbach's alpha is ≥ 0.60, although this is not an absolute standard (Sekaran, 2000). An instrument is considered reliable if the reliability coefficient is ≥ 0.60, indicating that the instrument consistently measures variables and can be used repeatedly to produce similar results (Hair *et al.*, 2011).

Validity testing is carried out using the Pearson moment correlation between each indicator score and the total construct score. A question item is considered valid if the Pearson correlation value with the total score is ≥ 0.30, which is significant at a 0.01 or 0.02 significance level.

The results of the validity and reliability tests, presented in Table 2, confirm that all the question items are valid because their correlation with the total score is ≥ 0.30, and statistically significant at the 0.01 and 0.02 levels. Additionally, the reliability test results show that all the Cronbach's Alpha values are ≥ 0.60, indicating that the instruments used in the research are reliable (Ghozali and Latan, 2015). Therefore, the instruments used in this study are both valid and reliable.

***Performance and user satisfaction level of coastal village facilities and infrastructure development*:** The respondents' responses regarding the level of performance of the development of village facilities and infrastructure are summarized in Table 3. The average value of the performance variable for developing self-managed village facilities and infrastructure is found to be 3.27. According to the Likert scale perception classification by Cooper and Schindler (2006), this value falls within the range of 2.51 – 3.50, which corresponds to the category "Quite Satisfactory."

This indicates that, based on the respondents' views, the performance of the development of self-managed village facilities and infrastructure in the coastal village is considered less than satisfactory. The community feels that the development has not fully met their needs or expectations, suggesting that the facilities and infrastructure provided do not entirely fulfill their desires or requirements for use.

Based on the frequency distribution of responses across all assessment indicators, the majority of respondents rated the performance of the self-managed village facilities and infrastructure development as "quite satisfactory" (46.72%). A smaller proportion rated it as "satisfied" (37.12%), and only 2.82% rated it as "very satisfied."

In terms of the individual indicators, which include factors like development implementation, expectations, quality, value, satisfaction, complaints, and trust, most of the responses fell within the 2.51–3.50 range, which corresponds to the "quite satisfactory" category.

Table 3. Performance of development of self-managed village facilities and infrastructure in self-managed coastal villages.

Indicator	Items	Mean	Average (mean)
Empirical description of facilities and infrastructure [EDI]	[EDI-1]	3,10	3,38
	[EDI-2]	3,68	
	[EDI-3]	3,05	
	[EDI-4]	3,64	
	[EDI-5]	3,62	
	[EDI-6]	3,70	
	[EDI-7]	3,17	
	[EDI-8]	3,06	
	[EDI-9]	3,41	
Hope [H]	[H-1]	3,12	3,28
	[H-2]	3,07	
	[H-3]	3,60	
	[H-4]	3,14	
	[H-5]	3,74	
	[H-6]	2,98	
Quality [Q]	[Q-1]	3,46	3,37
	[Q-2]	3,51	
	[Q-3]	3,13	
	[Q-4]	3,59	
	[Q-5]	3,40	
	[Q-6]	3,12	
Value [V]	[V-1]	3,34	3,28
	[V-2]	3,31	
	[V-3]	3,18	
Satisfaction (from physical facilities and infrastructure) [SF]	[SF-1]	2,99	3,18
	[SF-2]	3,40	
	[SF-3]	3,14	
Complaint [C]	[C-1]	3,07	3,17
	[C-2]	3,37	
	[C-3]	3,11	
	[C-4]	3,16	
Trust [T]	[T-1]	3,13	3,25
	[T-2]	3,12	
	[T-3]	3,44	
	[T-4]	3,50	
	[T-5]	3,38	
	[T-6]	3,53	
	[T-7]	3,08	
	[T-8]	3,02	
	[T-9]	3,16	
	[T-10]	3,23	
	[T-11]	3,15	
Total Performance (Average)			3,27

The lowest performance values were found in the areas of satisfaction (3.18) and complaints (3.17). These lower scores indicate areas of concern for the community. Specifically, the complaints mentioned in the research refer to: 1) The village government's ability to accommodate community aspirations regarding development proposals; 2) The frequency with which the government listens to and responds to community complaints; and 3) The accessibility of places for filing complaints (i.e., complaints are often directed to other organizations).

These findings suggest that the village community feels the government has not adequately addressed their concerns, with these issues falling below satisfactory levels in terms of responsiveness and participation in the development process. This indicates areas where improvements are needed in the implementation of village development.

The next result is an analysis of the level of community satisfaction as users of facilities and infrastructure using the Customer Satisfaction Index (CSI) technique as presented in Table 4.

The calculation of the Customer Satisfaction Index (CSI)

Table 4. Customer satisfaction index (CSI) analysis of satisfaction with the use of self-managed system facilities and infrastructure in coastal villages.

Indicator	Items	*MIS* *(mean importance score)*	*MSS* *(mean satisfaction score)*	*WF* *(weight factors)*	*WS* *(weight score)*	*CSI*
Empirical description of facilities and infrastructure [EDI]	[EDI-1]	4,33	3,10	2,56	7,92	67,77
	[EDI-2]	4,19	3,68	2,48	9,12	
	[EDI-3]	3,96	3,05	2,34	7,12	
	[EDI-4]	4,31	3,64	2,54	9,25	
	[EDI-5]	4,26	3,62	2,52	9,11	
	[EDI-6]	4,06	3,70	2,40	8,87	
	[EDI-7]	3,92	3,17	2,31	7,34	
	[EDI-8]	3,76	3,06	2,22	6,80	
	[EDI-9]	4,30	3,41	2,54	8,66	
Hope [H]	[H-1]	4,21	3,12	2,49	7,75	66,34
	[H-2]	4,16	3,07	2,46	7,54	
	[H-3]	3,81	3,60	2,25	8,09	
	[H-4]	4,12	3,14	2,43	7,64	
	[H-5]	4,23	3,74	2,50	9,33	
	[H-6]	4,37	2,98	2,58	7,68	
Quality [Q]	[Q-1]	4,14	3,46	2,44	8,45	67,47
	[Q-2]	4,19	3,51	2,48	8,70	
	[Q-3]	3,84	3,13	2,27	7,10	
	[Q-4]	4,14	3,61	2,44	8,81	
	[Q-5]	3,50	3,40	2,07	7,03	
	[Q-6]	4,07	3,12	2,40	7,48	
Value [V]	[V-1]	3,66	3,34	2,16	7,21	65,46
	[V-2]	4,15	3,31	2,45	8,10	
	[V-3]	4,20	3,18	2,48	7,90	
Satisfaction (from physical facilities and infrastructure) [SF]	[SF-1]	4,14	2,99	2,44	7,31	63,46
	[SF-2]	3,91	3,40	2,31	7,84	
	[SF-3]	3,66	3,14	2,16	6,78	
Complaint [C]	[C-1]	4,39	3,07	2,59	7,95	63,41
	[C-2]	3,57	3,37	2,11	7,10	
	[C-3]	3,58	3,11	2,11	6,56	
	[C-4]	3,60	3,16	2,13	6,72	
Trust [T]	[T-1]	3,73	3,13	2,20	6,90	64,90
	[T-2]	3,65	3,12	2,16	6,72	
	[T-3]	3,90	3,44	2,30	7,93	
	[T-4]	4,10	3,50	2,42	8,47	
	[T-5]	3,48	3,38	2,06	6,95	
	[T-6]	4,17	3,53	2,46	8,69	
	[T-7]	4,33	3,08	2,56	7,88	
	[T-8]	4,50	3,02	2,66	8,02	
	[T-9]	4,24	3,16	2,50	7,90	
	[T-10]	4,35	3,23	2,57	8,31	
	[T-11]	4,19	3,15	2,48	7,80	
Average						65,40
Total		169,34	138,09	100	328,81	
CSI						65,76

resulted in a value of 65.76. According to the satisfaction criteria provided in Table 4, this CSI value falls within the "quite satisfied" category, specifically within the range of 51.00 – 65.99. This indicates that the community, as users of the self-managed village facilities and infrastructure built from village funds in the coastal villages of Konawe Regency, is "quite satisfied" with the infrastructure development. However, this also means that the performance of the development does not fully meet the ideal project management principles, which should ensure greater user satisfaction.

***Indicators of Higher Satisfaction*:** The two highest-rated indicators were: a) Availability of Facilities and Infrastructure: 67.77 (categorized as "satisfied and/or important"); and b) Quality of Infrastructure: 67.47 (also categorized as "satisfied"). These results suggest that the community is relatively satisfied with the availability and quality of the infrastructure developed.

***Areas needing improvement*:** The remaining five indicators showed lower satisfaction levels (categorized as "sufficient"), indicating that there are areas where the community's expectations have not been fully met. These areas require attention and improvement to better align the infrastructure with the needs of the village community.

To enhance community satisfaction in the future, there is a need to improve the performance of the self-managed infrastructure projects, ensuring that they better meet the needs of the community, particularly in supporting economic and social activities.

The distribution of community satisfaction regarding the use of self-managed facilities and infrastructure in the coastal villages of Konawe Regency is visually presented in Figure 1.

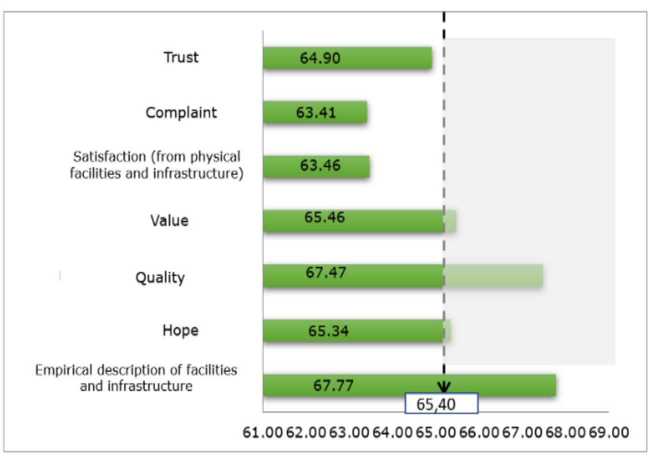


Figure 1. Satisfaction index for users of self-managed village facilities and infrastructure in coastal villages.

Based on the distribution of the satisfaction index across the study area, the satisfaction levels for the use of village facilities and infrastructure are categorized as "quite satisfied" across all districts, as shown in Figure 2. The respective CSI values for each district are: Soripia District: 65.74; Lalonggasumeeto District: 65.07; and Kapoiala District: 65.92.

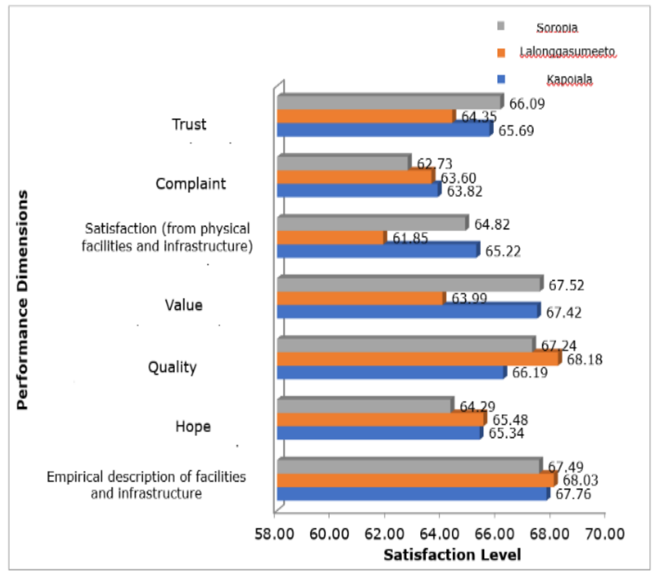


Figure 2. Regional distribution of user satisfaction index for village facilities and infrastructure with the self-managed system in coastal villages.

These values indicate that, while the community in each district expresses moderate satisfaction with the infrastructure and facilities, there is still room for improvement to reach higher satisfaction levels and meet the full expectations of the users. The overall trend shows consistency in the satisfaction levels across the three districts, all falling within the "quite satisfied" category.

***Model of the relationship between satisfaction level and the performance of self-managed system facilities and infrastructure development in coastal villages*:** To carry out Structural Equation Modeling (SEM) effectively, the initial step is to assess whether the data meets the necessary assumptions for SEM analysis. These assumptions are crucial for ensuring the reliability and validity of the SEM results. The primary assumptions to test include:

1. Normality: Ensuring that the data follows a normal distribution.
2. Outliers: Identifying any extreme values that might distort the analysis.
3. Linearity: Verifying the linear relationships between observed variables and latent variables.

CFA is employed as part of the SEM process to validate the measurement model. It assesses whether the observed variables (indicators) can reliably measure the latent variables (constructs). The loading factor values indicate the strength of the relationship between each indicator and its corresponding construct.

An indicator variable is considered to be a valid dimension of a latent variable if its loading factor is ≥ 0.40. Higher loading factors (preferably ≥ 0.70) are recommended as they indicate a stronger relationship. Loading factors between 0.50 and 0.60 are acceptable, particularly in the early stages of model development, but values below 0.50 may indicate weak indicators.

The significance of each indicator is tested using a p-value. A p-value ≤ 0.05 indicates that the loading factor is statistically significant, meaning the indicator contributes meaningfully to the latent construct.

For the user satisfaction variable, CFA will be used to determine which observed variables (indicators) reliably measure community satisfaction with the development of village facilities and infrastructure through the self-managed system. The factor loading for each indicator reflects its contribution to the latent variable of satisfaction. The CFA results can be seen in Table 5, which will display the loading factor values for each indicator. As shown in Table 5, if an indicator has a loading factor ≥ 0.40, it can be considered a valid measure for the satisfaction construct. Indicators with higher loadings (≥ 0.70) are highly reliable and can be used confidently in the SEM analysis. If any indicators have low loading factors (below 0.40), they may need to be revised or excluded from the model. Significance tests (p-value ≤ 0.05) will confirm whether each indicator is significantly contributing to the measurement of the latent variable.

Table 5. Loading factor variable satisfaction with the use of facilities and infrastructure.

No.	Variable Indicator	Loading factor	p-value
1	Empirical description of facilities and infrastructure (X1)	0,784	0,000
2	Hope (X2),	0,774	0,000
3	Quality (X3)	0,873	0,000
4	Value (X4)	0,841	0,000
5	Satisfaction (from physical facilities and infrastructure) (X5)	0,846	0,000
6	Complaint (X6)	0,825	0,000
7	Trust (X7)	0,877	0,000

The results of Confirmatory Factor Analysis (CFA) for the user satisfaction variable in this study provide clear evidence of the significance and contribution of the indicators used to measure satisfaction with the development of self-managed infrastructure.

All indicators for the satisfaction variable have a loading factor value of ≥ 0.70, indicating that all contribute significantly to the satisfaction construct. The p-value for each indicator is <0.05, confirming that the relationship between the indicator and the satisfaction variable is statistically significant.

The indicators tested include: Description of self-managed infrastructure; Expectations; Quality; Value; Satisfaction (facilities and physical infrastructure); Complaints; and Trust. All indicators are significant, meaning they reliably measure the latent variable of community satisfaction with self-managed village infrastructure. This means that each indicator reflects how strongly each indicator contributes to the satisfaction variable. The values are as follows: a) Description of self-managed infrastructure: 0.784; b) Expectations: 0.774; c) Quality: 0.873; d) Value: 0.841; e) Satisfaction (physical facilities and infrastructure): 0.846; f) Complaints: 0.825; and g) Trust: 0.877. These values indicate that all indicators have a strong contribution to the satisfaction variable, with Trust and Quality having the highest contribution (both with loading values of more than 0.87), and Expectations having the lowest contribution (load value of 0.774).

Trust and Quality are the most dominant satisfaction indicators, with external loading values of 0.877 and 0.873, respectively. This indicates that community trust in the development process and their perception of infrastructure quality are the most significant factors influencing their overall satisfaction. Expectations (with an external loading of 0.774) are the least dominant factor, but still contribute significantly to the satisfaction variable.

The findings indicate that community satisfaction with the self-managed infrastructure system is greatly influenced by their trust in the process and the perceived quality of the facilities. This highlights the importance of building trust and ensuring high quality in infrastructure development to improve community satisfaction.

But then, we provide notes for future improvements in the self-managed infrastructure system. Efforts should be focused on building trust and improving quality. Ensuring that community trust is fostered through transparency, accountability, and involvement in the development process is likely to lead to increased satisfaction. In addition, responding to community expectations and perceptions of value can further improve their satisfaction with the infrastructure, while complaint handling mechanisms should be simplified to better address emerging issues.

The results of the next analysis are for the performance variable for building self-managed village facilities and infrastructure. This variable uses the same measure as satisfaction, with the analysis results as presented in Table 6.

In this section, we discuss the results of the performance variable indicators and the model suitability test used to evaluate the structural model for the self-managed village facilities and infrastructure development.

The Confirmatory Factor Analysis (CFA) results show that all indicators for the performance variable (Y1-Y7) have loading factor values ≥ 0.70 and p-values < 0.05, indicating that all indicators are statistically significant and reliable in explaining the performance construct. The high loading factor values demonstrate the strength of each indicator in contributing to the overall performance evaluation.

Table 6. Factor loadings for performance variables.

No.	Variable Indicator	Loading factor	p-value
1	Empirical description of facilities and infrastructure (X1)	0,989	0,000
2	Hope (X2),	0,934	0,000
3	Quality (X3)	0,876	0,000
4	Value (X4)	0,951	0,000
5	Satisfaction (from physical facilities and infrastructure) (X5)	0,964	0,000
6	Complaint (X6)	0,942	0,000
7	Trust (X7)	0,988	0,000

Description of Facilities and Infrastructure (0.989) and Trust (0.988) are the most dominant indicators, reflecting over 98% of the performance variable. This suggests that how the infrastructure is described to the community and their trust in the development process are key factors in determining performance.

Satisfaction from Physical Development Results (0.964) and Complaints (0.942) also have relatively high contributions, indicating that satisfaction with the results and how complaints are handled are significant aspects of performance.

The Perception of Quality (0.876) shows a slightly lower but still substantial contribution, indicating that quality plays an important, though slightly less dominant, role in evaluating performance.

The model suitability test is conducted to evaluate how well the proposed structural model fits the data and whether it accurately represents the population characteristics. The results of the model suitability analysis are essential for assessing whether the model is appropriate for the research and if any adjustments are necessary.

The fit indices (such as Chi-Square/DF, RMSEA, CFI, and TLI) are used to assess the quality of the model fit. Ideally, a good fit is reflected by values that are close to the cut-off thresholds for each index. However, the results of the model suitability analysis show that the model does not fully meet the fit criteria, as the model suitability index values do not meet the predetermined cut-off-point values. This suggests that the proposed model may need to be adjusted or improved in order to more accurately represent the relationships between the variables.

The high loading factor values for Description of Facilities (0.989) and Trust (0.988) indicate that these two factors play a critical role in determining the performance of infrastructure projects in the self-managed system. Ensuring clear communication about the facilities and fostering community trust in the development process will be crucial for improving the perception of performance.

While Perception of Quality (0.876) has a lower loading factor compared to other indicators, it still plays a significant role in performance evaluation. Improving the quality of infrastructure and addressing any concerns related to construction or design will help enhance the overall performance perception.

The findings that the model does not fully meet the suitability test suggest that model refinement is necessary. This could involve revisiting the relationships between variables or adjusting the measurement model to ensure better fit indices. The model may require re-specification of certain paths or reconsideration of how certain indicators are grouped or weighted to improve the overall model fit. This can be done by testing alternative models or adjusting the indicators that did not meet the fit criteria.

Overall the research model can be said to be not yet fit, this is indicated by the model suitability index value not being by the predetermined cut-off-point value (Table 7).

Table 7. Goodness-of-fit indices.

Model suitability criteria	Structural model difficulty index	Cut-Off-Point	Information
Chi-Square	187,206	Expected to be small	Not fit yet
Probaility	0,000	≥ 0,05	Not fit yet
RMSEA	0,90	≤ 0,08	Not fit yet
CMIN/DF	2,463	≤2,000	Not fit yet
GFI	0,855	≥ 0,90	Not fit yet
AGFI	0,800	≥ 0,90	Not fit yet
CFI	0,969	≥ 0,90	Already Fit
NFI	0,963	≥ 0,90	Already Fit
TLI	0,949	≥ 0,90	Already Fit

Table 8. Goodness-of-fit indices.

Model suitability criteria	Structural model difficulty index	Cut-Off-Point	Information
Chi-Square	116,859	Expected to be small	Already Fit
Probability	0,001	≥ 0,05	Not fit yet
RMSEA	0,057	≤ 0,08	Already Fit
CMIN/DF	1,579	≤2,000	Already Fit
GFI	0,915	≥ 0,90	Already Fit
AGFI	0,879	≥ 0,90	Marginal
CFI	0,988	≥ 0,90	Already Fit
NFI	0,985	≥ 0,90	Already Fit
TLI	0,968	≥ 0,90	Already Fit

Modification of the model is required by connecting or correlating variables (Hair *et al.*, 2011). Based on the modification index instructions in the AMOS program output, in this research model modifications were carried out by connecting the knowledge management latent variable and the infrastructure knowledge management latent variable (in Table 8).

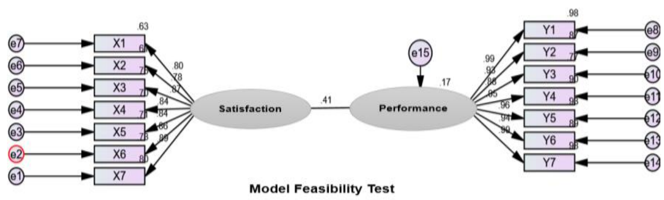
Based on the results from AMOS and the SEM analysis as presented in Figure 8, the following are described:

1. Chi-Square (X^2) Value, 116.859 with a probability of 0.01
   The chi-square statistic is significant at the $\alpha = 0.05$ level, which indicates that the model is not a perfect fit for the data. However, it is common for structural models to have a significant chi-square in larger datasets, so this result is not necessarily a major issue. The chi-square test tends to be sensitive to sample size, and slight deviations are expected.
2. RMSEA (Root Mean Square Error of Approximation), $0.057 \leq 0.08$
   The RMSEA value is below the acceptable threshold (0.08), which indicates a good fit. RMSEA is a commonly used index in SEM to assess model fit, with values below 0.08 suggesting a reasonable approximation of the model to the data.
3. CMIN/DF (Chi-Square Minimum/df),
   The ratio of chi-square to degrees of freedom is typically considered acceptable when it is below 3. A lower value indicates a better fit. As long as the ratio is under this cut-off, it suggests that the model fits reasonably well.
4. GFI (Goodness-of-Fit Index), > 0.90
   GFI values above 0.90 suggest that the model is a good fit. The model produced a value that meets the threshold, showing that it explains a good portion of the variance in the data.
5. CFI (Comparative Fit Index), > 0.90
   The CFI is another important index. A value greater than 0.90 indicates that the proposed model fits the data better than a baseline model. In this case, the model meets the required standard.
6. NFI (Normed Fit Index), > 0.90
   A value above 0.90 indicates a good fit between the observed and model-implied covariance structures. This suggests that the proposed model is a reasonable representation of the data.
7. TLI (Tucker-Lewis Index), > 0.90
   The TLI value is also above the threshold of 0.90, further confirming that the model has an acceptable fit to the data.
8. AGFI (Adjusted Goodness-of-Fit Index) = 0.879 < 0.90
   While this value is slightly below the acceptable threshold of 0.90, it is relatively close. Some researchers argue that a small deviation from the cut-off can be acceptable, especially when other fit indices (such as RMSEA, CFI, and NFI) meet the required standards. However, the AGFI value suggests that there is still some room for improvement in the model, particularly in its parsimony.

The parsimony principle in structural equation modeling suggests that a model should not only fit the data well but should also be as simple as possible while still explaining the relationships effectively. This principle is important for balancing model complexity and goodness-of-fit.

Despite the AGFI value being slightly below the threshold, the model still meets the majority of the necessary fit indices (RMSEA, CFI, NFI, TLI), and this suggests that the model is relatively parsimonious and robust. Hair *et al.* (2011) propose that if most fit indices meet the expected values, the model can still be considered acceptable, especially if the theory behind the model is sound and it is supported by empirical data. In this case, since the model meets key indices (such as RMSEA, CFI, and NFI), it is appropriate to conclude that the model is valid and useful for understanding the relationships between the variables.

The relationship model output from structural equation modeling (SEM) analysis of the influence between variables is presented in Figure 3.



Model Feasibility Test
Chi-square=187.206
Prob=.000
Df=76
CMIN/DF=2.463
GFI=.855
AGFI=.800
CFI=.969
TLI=.963
NFI=.949
RMSEA=.090

Figure 3. Output of structural equation modeling (SEM) analysis of the influence of research variables.

The primary purpose of testing the structural relationship model in this research is to assess the influence of latent variables on each other and to validate the research hypotheses. This process helps understand how user satisfaction affects the performance of infrastructure development in coastal villages, focusing on the relationships between the variables in the proposed model.

After conducting Confirmatory Factor Analysis (CFA) and obtaining significant results for each latent variable indicator, the next step is to examine the structural model. This involves analyzing the relationships between the latent variables and the measurement error of observed variables. Specifically, this research tests two major structural relationships: 1) The Effect of Satisfaction on Performance: This relationship forms a central part of the hypothesis and is depicted in Figure 4; and 2) The Relationship Between Exogenous and Endogenous Variables: The model tests how external (exogenous) variables influence internal (endogenous) variables.

Based on the data analysis, the structural model shows that there is a positive and significant relationship between the latent variables, particularly between satisfaction and performance in the context of the self-managed infrastructure system in coastal villages.

Relationship of Satisfaction to Performance, where satisfaction as a predictor of performance shows that user satisfaction directly affects perceived infrastructure project performance. Higher levels of user satisfaction with the development process tend to lead to better perceived facility and infrastructure performance.

This relationship confirms that community satisfaction is an important determinant of the success and performance of infrastructure development projects. Ensuring that community needs are met and addressing their problems can result in better project outcomes.

The Influence of Exogenous Variables on Endogenous Variables, that various exogenous variables (such as trust, quality, and knowledge management) affect endogenous variables (such as satisfaction and performance). Trust and quality emerged as the strongest exogenous factors influencing user satisfaction and performance, which is in line with the results of Confirmatory Factor Analysis (CFA).

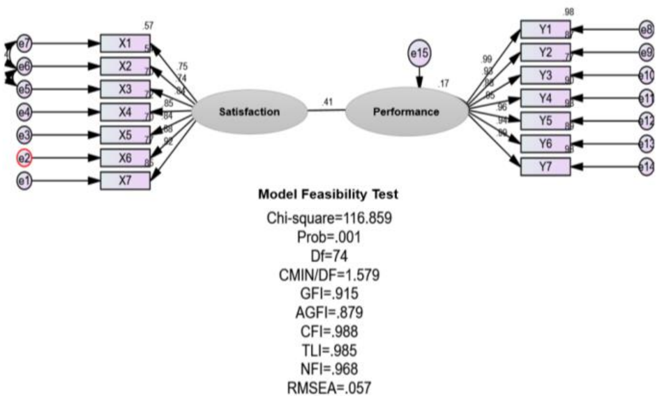


Figure 4. Output of structural equation modeling (SEM) analysis of the influence of research variables after improvement.

Next are the results of the suitability analysis of the structural model which was built as a basis for analyzing the relationship between latent variables with standard regression weight values. The aim is to determine the relationship between latent variables and the level of significance of the relationship in question. The results of the analysis are presented in Table 9.

The results of the Structural Equation Modeling (SEM) analysis provide a clear and statistically significant relationship between user satisfaction and the performance of the development of village facilities and infrastructure in coastal villages using a self-management system.

Regression Weight (Path Coefficient):

The path coefficient between user satisfaction (Y) and performance (X) is 0.281. This indicates that for every unit increase in user satisfaction, the performance of the development increases by 0.281 units. The positive value of the path coefficient suggests that higher levels of user satisfaction are associated with better performance in infrastructure development.

Critical Ratio (CR) and Significance:

The Critical Ratio (CR), also known as the t-test, evaluates whether the relationship between satisfaction and performance is statistically significant. The p-value associated with this path coefficient is 0.000, which is less than the significance level ($\alpha = 0.05$). This confirms that the relationship between satisfaction and performance is significant.

Hypothesis Testing: Research Hypothesis:

The research hypothesis states that "*User Satisfaction Has a Positive and Significant Influence on the Performance of Facilities and Infrastructure Development Using a Self-Managed System in Coastal Villages*." The positive path coefficient (0.281) and significant p-value (0.000) provide evidence to accept the hypothesis. This means that user satisfaction does indeed have a positive and significant influence on the performance of the self-managed infrastructure development process in the coastal villages.

Mathematical Expression of the Relationship:

The relationship between satisfaction (Y) and performance (X) can be expressed as:

$$Y=0.281X+0.049Y = 0.281X + 0.049Y=0.281X+0.049$$

This equation suggests that the performance of the development is positively influenced by the satisfaction of the users (villagers). Specifically, for every increase in user satisfaction, performance improves by 0.281 units, and there is also a constant value of 0.049 in the model.

The positive path coefficient (0.281) and significant p-value (< 0.05) indicate that satisfaction plays an important role in driving performance. This suggests that user satisfaction is not only important for improving performance but that its influence is substantial and statistically reliable.

The structural model presented in Figure 4 confirms the positive relationship between the two variables. The model clearly shows that satisfaction impacts performance, which aligns with the results from the regression analysis.

Table 9. Direct influence between research variables.

Description	Estimate	S.E	C.R	P	Information
Satisfaction <--- Performance	0,281	0,049	5.767	0,000	Significant

It can be concluded that Satisfaction → Performance confirms that user satisfaction has a positive and significant effect on the performance of the self-managed infrastructure development in coastal villages. This means that efforts to increase user satisfaction with the self-managed system, such as improving the quality of infrastructure or addressing community complaints, can lead to better performance in infrastructure development.

The findings suggest that focusing on improving user satisfaction, especially in terms of trust and quality, would likely lead to better outcomes in future development projects. Then satisfaction is a driver of performance, engaging the community more effectively, ensuring their involvement in the decision-making process, and addressing their concerns will likely improve the outcomes of self-managed village infrastructure projects.

DISCUSSION

***Performance and user satisfaction level of coastal village facilities and infrastructure development*:** The analysis of the performance of self-managed village facilities and infrastructure development in coastal villages reveals a "quite satisfied" level of user satisfaction, suggesting that the development's performance is not yet fully optimal. This indicates that there is significant room for improvement in several areas, particularly the indicators with lower satisfaction scores. Below is a breakdown of the findings, their implications, and the recommendations for future interventions.

These studies emphasize that inadequate attention to community needs, particularly in planning, implementation, and supervision, often leads to unsatisfactory results. In this case, the self-management system has been found to face similar challenges.

The findings align with previous research, such as Batubara *et al.* (2020); Chen *et al.* (2018), which found that infrastructure development often fails to meet community expectations, especially in terms of fulfilling socio-economic needs. Similarly, Meena (2019); and Setyorini and Susilowati (2019) point out issues like low feasibility and implementation challenges in self-managed village infrastructure projects.

To address the areas where the performance of the self-managed system is lacking, the following interventions should be prioritized:

1. Improve Complaints Handling and Response Mechanisms. The low rating for complaints suggests that villagers do not feel their issues are addressed effectively. Streamlining complaint mechanisms, ensuring transparency, and providing timely responses to community concerns will help increase trust in the system.
2. Enhance User Satisfaction with Infrastructure Use. Low satisfaction with use indicates that while facilities are built, they may not meet the actual needs of the community, or there may be issues related to maintenance or usability.
3. Build Trust in the Development Process. Trust is a critical indicator that has shown moderate performance. Trust in the development process is essential for increasing community engagement and cooperation in the project.
4. Increase Perceived Value and Benefits. Perception of Value is another key area where satisfaction is relatively low. The community may not see the full benefits or value from the infrastructure.
5. Set Realistic and Clear Expectations. The hope for goodness indicator reflects expectations that may not always align with the reality of infrastructure development, possibly due to unrealistic community expectations or inadequate communication.

The practical consequences of these findings are useful for the Government. First, Village Governments and the Central Government must closely monitor and evaluate indicators related to complaints, satisfaction, trust, values, and expectations. They must focus on ensuring that development projects meet not only physical infrastructure needs but also the socio-economic needs of the community. Second, Future evaluations and interventions must prioritize improving self-management systems to address the gaps identified in the analysis. This includes facilitating community engagement and providing ongoing support for project monitoring and quality control.

***Model of the relationship between satisfaction level and the performance of self-managed system facilities and infrastructure development in coastal villages*:** The findings from this study indicate that user satisfaction has a significant positive influence on the performance of self-managed village facilities and infrastructure development in coastal villages. This suggests that higher satisfaction levels with the infrastructure development lead to better overall performance, reinforcing the idea that community engagement and satisfaction are crucial drivers of successful infrastructure projects. The relationship between satisfaction and performance underscores the importance of prioritizing the needs of the community in the planning and implementation stages.

The theoretical implications of this finding support the theoretical perspective that satisfaction from implementation directly affects the performance of infrastructure projects. This finding is consistent with the views of Giri (2019); Bresnen and Marshall (2011); and Teo and Loosemore (2001), who emphasized that community satisfaction is a major determinant of the success of infrastructure projects.

Then supports the theory of "User-Centered Approach". This theory highlights that community satisfaction should be at the center of planning and implementing every development project. The strong relationship between satisfaction and performance suggests that if infrastructure meets community expectations, the project is likely to be considered successful, and its performance will be considered higher.

Significant practical implications of these findings for village development are outlined below:

1. Incorporating Community Feedback. The study stresses the need for active community involvement in the planning and execution of self-managed infrastructure projects. Local governments and development actors (such as the Village Head, Village Officials, and Service Providers) should create feedback mechanisms that allow community members to voice their concerns and aspirations during the project development phase.
2. Human Resource Capacity Building. One key factor in successful project implementation is the human resource aspect. As emphasized by Giri (2019), Bresnen and Marshall (2011); Teo and Loosemore (2001), strengthening the capacity of project managers, officials, and service providers is critical. Development professionals must have the necessary skills in community engagement, project management, and problem-solving to ensure the project meets expectations and is successfully implemented.
3. User-Centered Project Management. A user-centered approach means that the development process should focus on the interests and needs of the community, not just the physical construction of facilities. The project management team should work collaboratively with the community to ensure that infrastructure development is tailored to their expectations and preferences.
4. Addressing Identified Issues. The study also suggests that addressing common barriers to successful implementation, such as lack of community trust, poor communication, and unrealistic expectations, is essential to improving performance and satisfaction. This aligns with findings from Noor and Mursadin (2021), Chahyadi and Prasetia (2019); Chen *et al*. (2018), who reported similar challenges in village infrastructure development.

Conclusion**:** The implementation of the project management system in developing self-managed facilities and infrastructure in coastal villages is currently rated as "Quite Satisfactory." This indicates that, while progress has been made, the management system is still not at the desired level of ideal performance. As such, improvements are necessary, particularly in the human resource aspect and user satisfaction indicators identified through this study. The findings highlight areas that require attention to enhance the overall effectiveness of these projects.

Although the self-managed system has shown positive outcomes in certain aspects, significant gaps remain in the areas of complaints handling, satisfaction with usage, trust, value perception, and expectations management. Addressing these gaps is vital for improving both the performance and community satisfaction associated with these infrastructure projects. The study suggests that regular evaluations and timely interventions are essential for ensuring these projects meet the community's evolving needs and expectations.

Furthermore, the linkage model developed in this study shows that community satisfaction (X) has a positive and significant impact on the performance (Y) of self-managed infrastructure development. The two most significant factors influencing user satisfaction are trust and quality, and these should be continually strengthened. However, it is also essential to focus on improving other indicators—including infrastructure description, expectations, value perception, satisfaction with physical outcomes, and complaints handling—so that these elements can contribute more effectively to enhancing future performance.

Ultimately, for the self-managed infrastructure system to reach its full potential, the engagement of the community in the development process, combined with consistent efforts to address key performance gaps, will be essential in driving both satisfaction and sustainability in coastal village development.

Theoretical implications (novelty)**:** Theoretically, this research introduces a novel approach to understanding the dynamics between user satisfaction and the performance of project management systems in the development of self-managed village facilities and infrastructure in coastal areas. The novelty lies in the application of user satisfaction as a critical factor influencing the performance of infrastructure projects, specifically within the context of coastal village communities. This relationship has been underexplored in previous studies, especially in settings where self-managed systems are employed.

The findings from this study suggest that the self-managed project management system used for infrastructure development in coastal villages is still at a "quite satisfactory" level. While the system has shown some positive outcomes, it has not yet met the expectations of the community, indicating that there is room for significant improvement. This highlights an important theoretical aspect: user satisfaction plays a key role in shaping the success and performance of such projects.

The research demonstrates that user satisfaction has a significant influence on the performance of village infrastructure projects. Communities that are more satisfied with the infrastructure are more likely to view the development process positively, which in turn contributes to better project performance and long-term sustainability. This finding aligns with previous research on the role of satisfaction in project management (Bresnen and Marshall, 2011; Teo and Loosemore, 2001), but adds new value by showing the specific mechanisms through which user satisfaction can drive performance improvements in self-managed infrastructure development systems.

This theoretical contribution underscores the importance of involving users in the planning and implementation of infrastructure projects, ensuring that their expectations and needs are prioritized. By focusing on satisfaction—particularly in areas like trust, quality, complaints handling, and expectations management—project managers can optimize the performance of infrastructure projects in coastal villages, ensuring that they better serve the community's socio-economic needs.

In summary, the study highlights the theoretical novelty of integrating user satisfaction as a pivotal determinant of project performance in the context of self-managed village infrastructure systems. It underscores the importance of aligning infrastructure development practices with community needs and expectations to enhance both satisfaction and overall performance.

***Practical implications*:** The Central Government should use the research findings to reshape and fine-tune the policies governing the use of village funds. This approach will help create more effective and community-centered infrastructure development programs that benefit society and contribute to economic, social, and cultural advancement in coastal villages.

By taking a more integrated approach to managing infrastructure development, both at the local and national levels, and ensuring that projects are aligned with community needs and expectations, the government and other stakeholders can ensure that these self-managed systems are more effective and impactful in the future.

***Limitations*:** One of the key limitations of this research is the use of cross-sectional data, which means that the data was collected at a single point in time. While this allows for a snapshot of the current state of satisfaction and performance in the development of self-managed village infrastructure, it limits the ability to draw conclusions about temporal changes or long-term trends. Cross-sectional data does not account for how satisfaction and performance might evolve over time, making it difficult to capture the dynamic nature of infrastructure projects, particularly in the context of ongoing village development processes.

Furthermore, the generalizability of the findings may be affected, as cross-sectional data only reflects the situation in a specific period and may not be representative of changes that could occur in the future or across different contexts. For example, the results of this study might be applicable to the specific coastal villages surveyed, but might not be applicable to other regions or at different times when conditions may change (e.g., economic factors, government policies, or community expectations).

***Suggestions for future research*:** To address these limitations and strengthen the findings, future research should consider using longitudinal data, such as time series data or big data. Longitudinal data would allow researchers to track changes in satisfaction and performance over a period of time, providing a clearer picture of how user satisfaction with infrastructure evolves as a result of various factors such as improvements in management, changes in community expectations, or ongoing developments in the infrastructure itself. This would also provide more insight into causal relationships over time, rather than just correlations that are present at a single point in time.

Specific Suggestions for Future Research:

1. Future studies should use data collected over a period of several years to understand how the performance of self-managed infrastructure systems evolves over time. This would allow researchers to capture temporal patterns in community satisfaction and performance, helping to identify trends, improvements, or declines in infrastructure development.
2. The use of big data tools and techniques could allow researchers to analyze large volumes of data from multiple villages or regions, providing more robust and generalizable findings. Big data could include not only survey data, but also social media sentiments, feedback from community platforms, or government records that track the progress and issues in infrastructure projects across different periods.
3. Future research could also consider employing experimental or quasi-experimental research designs to test the impact of specific interventions on infrastructure performance and satisfaction. For instance, comparing villages with different project management strategies or policies could help determine the effectiveness of various approaches to self-managed development.
4. In addition to quantitative data, incorporating qualitative research such as interviews, focus groups, or case studies could provide a deeper understanding of the context behind the data and shed light on the human factors that influence satisfaction and performance in the development of self-managed infrastructure. These qualitative insights could help interpret the patterns identified through quantitative methods and inform practical strategies for improving project management.

By incorporating these approaches in future research, the findings would not only have greater temporal and spatial relevance, but also a stronger generalizability that could be applied across different regions, times, and contexts. This would improve our understanding of how to optimize self-managed infrastructure projects and create more effective development strategies for coastal villages and other communities relying on similar systems.

***Author contributions*:** Hasddin as the main contributor, was involved in all research processes and manuscript preparation. Fajar Saranani drafted the concept and theory and was the correspondent. Saemu Alwi, Muhammad Idham Handa, and Marjani analyzed the data. Tri Astuti, Rudi Azis, Asrul, Samsul Bahari, Tachrir and Wiwin Sultraeni checked the validity of the research and conducted a quality screening of

the manuscript. All authors have read and approved the final version for publication.

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***SDGs addressed*:** Industry, Innovation, and Infrastructure, Sustainable Cities and Communities, No Poverty.

***Informed consent*:** Informed consent is applicable.

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