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D. Pangemanan*, R. Usman Latief, S. Hamzah, R. Arifuddin

Department of Civil Engineering, Universitas Hasanuddin, Indonesia

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ABSTRACT

Sustainability construction is starting to become a focus in developing countries such as Indonesia. There are many problems that must be considered in the implementation of sustainable construction. The purpose of this study is to analyze the factors that influence the implementation of sustainable construction in the Likupang SEZ project. The method used is a mixed-method to determine various factors that affect sustainable construction. This research involves various stakeholders such as contractors, consultants, academics, company owners, the government, and the community. The results of this study indicate that the economy and government have a positive and significant influence on sustainable construction. Meanwhile, human resource factors and cultural factors have a positive but not significant effect on sustainable construction. The results of this study also show that environmental, social and investment factors have a negative influence on the implementation of sustainable construction. This study concludes that factors that have a positive and significant impact must be strengthened by prioritizing the role of the government in implementing sustainable construction that has an impact on economic factors, while an adequate strategy is needed to reduce the negative impact of factors that have a negative impact on sustainable construction.

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1. INTRODUCTION

Various infrastructures being built today are starting to implement the principles of sustainable construction. This causes many factors to be considered, starting from basic aspects such as technical infrastructure and social infrastructure. Technical infrastructure can be the construction of facilities such as roads, bridges, dams, airports, and ports. While social infrastructures such as the construction of school buildings and hospitals. In its development, environmental issues have become a priority aspect. This is caused by the issue of global warming, which became a central issue in development and the environment. Thus, environmental issues become the basis of the development process. In this context, infrastructure development must take into account the environment, society, and economy to ensure its sustainability. It is in this context that the term sustainable construction becomes the basis for development. An approach is urgently needed to achieve sustainable development that adopts three main pillars in infrastructure development, such as economic, environmental, and social disparities.

The concept of sustainable construction must have an approach to carrying out the series of activities needed to create a physical facility that meets economic, social, and environmental goals at present and in the future. This concept is a way for the construction industry to realize sustainable development by considering social, economic, environmental, and cultural issues. Sustainable development is a development that seeks to meet the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable construction must meet principles such as common goals, understanding, and action plans, compliance with security, safety, health, and

*Corresponding Author Institutional Email: daisypangemanan79@gmail.com (D. Pangemanan)

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sustainability standards, reducing the use of resources, whether in the form of land, materials, water, natural resources, and human resources, reducing waste generation. , both physical and non-physical, reuse of resources that have been used previously, use of recycled resources, protection and management of the environment through conservation efforts, risk mitigation of safety, health, climate change, and disasters, orientation to the life cycle, orientation to the achievement of the desired quality, technological innovation for continuous improvement, institutional support, leadership, and management in implementation. In its implementation, it is necessary to have good management and involve various related parties as a form of shared responsibility in maintaining the ecosystem. The implementation of sustainable construction has, in fact, not been fully implemented in accordance with the guidelines contained in the regulation of the Minister of Public Works and Public Housing. The application also varies according to regional conditions, the level of mutual understanding, of sustainable construction by construction project stakeholders, the availability of various existing resources in the form of natural resources (materials and building materials), human resources (construction experts, workers, technicians, laboratory staff, etc.), the availability of other resources such as heavy equipment, implementation methods, as well as adequate financial support.

Massive infrastructure development in Indonesia in the last decade has brought Indonesia to a country that focuses on infrastructure development. This can be seen from the many constructions of toll roads, bridges, airports, dams, ports, and special economic zones in Indonesia. One of the focuses on development is the Special Economic Zone (SEZ). The SEZ was built to become a national area in order to support the industrial, economic, education, and tourism sectors. One of the SEZs built in North Sulawesi is Tanjung Pulisan SEZ, Likupang. This SEZ is expected to become an international gateway in eastern Indonesia. Tanjung Pulisan SEZ is 58.5 km from the capital city of North Sulawesi, Manado, and can be reached by road in approximately 1 hour 47 minutes. This SEZ is also supported by an international export-import port in Bitung City, which is 33.4 km away and can be reached in 1 hour 6 minutes. Some of the main components of infrastructure to be built in Tanjung Pulisan SEZ, namely Hotels, Resorts, and Private Piers which are named the golden triangle dock which include Likupang, Wakatobi, and Raja Ampat.

In practice, sustainable construction requires a model that can be implemented easily and in accordance with the technical, environmental, social, and cultural context of the community. The absence of this has created serious problems in its implementation both at the regional and national levels. Several solutions have been created to try to solve the problem. The government through the Ministry of Public Works and Public Housing (PUPR) has issued Ministerial Regulation Number 9 of 2021 concerning Guidelines for the Implementation of Sustainable Construction as a guide in the implementation of sustainable construction, but its implementation is still constrained by the diverse context in society which is the subject of this sustainable construction implementation. Another solution that is tried to be studied in several studies is to model sustainable construction well. One of the studies made is the development of a framework in order to achieve sustainable construction [1]. In addition, the human resource factor is tried to be included as a determining factor in the success of sustainable construction management [2]. Human resources also include commitment and performance on various construction projects [3]. Modeling of sustainable construction has been tried by taking into account government, cost, knowledge and information, workforce, and client and market factors. This model has been implemented in Malaysia [4]. Factors that need to be considered are cultural factors as factors that are tried to be included as important factors in environmental sustainability by taking into account the factors of attitudes, company culture, and social responsibility [5]. A holistic solution is needed in building an appropriate model [6]. Sustainable construction is very important to pay attention to local communities as part of the overall model [7]. The absence of a holistic sustainable construction model requires a comprehensive solution by conducting an in-depth study to formulate the right model for implementing sustainable construction. Some of the solutions that have been tried have not been able to solve the problem comprehensively, especially the problems that arise as a result of local wisdom that is not paid attention to in the context of implementing sustainable construction, so it is necessary to conduct an in-depth study to formulate it. Other problems that arise because of this gap, such as government regulations regarding the availability of procurement documents based on sustainable construction are still not consistently implemented during the selection of service providers. In addition, several obstacles need to be overcome by building a model that can be a guide in the implementation of this sustainable construction. These obstacles are in the form of sustainable construction stages, namely aspects of programming, technical planning, construction implementation, utilization, and demolition.

In this study, it is seen that there is a gap that occurs due to the absence of a model due to the many factors that contribute to sustainable construction, so it is very important to conduct a study of these various factors which can later be used as a model of sustainable construction. Several models that have been built previously are difficult to implement because these factors are not compatible with the local culture in the area. The factors listed in some of these models have several drawbacks such as being too simple and difficult to implement in the field, even though sustainable construction involves many complex factors. On the other hand, in Tanjung Pulisan Likupang SEZ area, cultural factors are a decisive factor, because many local pearls of wisdom are continuously maintained and legalized through village regulations and regional regulations. This causes these models to be difficult to implement. Therefore, it is urgently needed a comprehensive study that contributes to a sustainable construction model that is holistic in nature and becomes a guide for all stakeholders of sustainable construction so that its implementation becomes easier. In this study, a study was conducted on various factors that contributed to the sustainable construction model such as Economic, Social, Environmental, Regulatory, experience, and investment as pre-existing factors. However, these factors have not been holistic, so this study tries to propose a new model that incorporates local cultural/wisdom factors as a new factor in shaping the success of sustainable construction. Thus, it is hoped that a new model of sustainable construction will be formed that is easier to implement.

2. METHOD

The research method used is a mixed-method between quantitative and qualitative methods. Mixed Methods Research is a research design based on philosophical assumptions as well as the method of inquiry. Mixed Methods Research is also referred to as a methodology that provides philosophical assumptions in showing directions or giving instructions on how to collect data and analyze data as well as a combination of quantitative and qualitative approaches through several phases of the research process. As a method, mixed methods research focuses on data collection and analysis and combines quantitative data and qualitative data in both a single study and a series study. The central premise that is used as the basis for mixed methods research is to use a combination of quantitative and qualitative approaches to find better research results than using only one approach (for example, with a quantitative approach or a qualitative approach only).

Researchers use this method because mixed method research produces more comprehensive facts in researching research problems. Thus, researchers have the freedom to use all data collection tools according to the type of data needed. The combined method combines quantitative and qualitative research. Researchers choose to conduct research with a qualitative approach first and then proceed with qualitative research, or vice versa. This is to first see the characteristics of the data in the field, prove the model and justify the results being analyzed. In the quantitative method, the nature of reality is single, classified, concrete, observable and measurable. Then the researcher continued with the qualitative method to analyze the data holistically, dynamically, the results of the construction, and gain understanding to build a strategy according to the research objectives to be achieved (see Figure 1).

For qualitative methods, researchers use to build a strategy to be achieved. The strategy in question is the method chosen so that the achievement of goals can be effective and efficient. This research strategy is related to the acquisition of data in accordance with the indicators of each variable or symptom studied. To be able to prove that the data is an indicator of a variable or a symptom, there are two strategies that can be used, namely by understanding. These two types of strategies each have their own goals.

The first strategy is the measurement strategy, which aims to determine the amount of data that is realized in the form of numbers. All symptoms can be converted into numbers, where this number shows the size or quality of the indicator of the variable. After being measured, then calculated. This process is called the data quantification process, so the resulting data are called quantitative data. While the second strategy is an understanding strategy, namely by seeking deeper information about what is the meaning behind the symptoms that appear from the outside. Researchers are required to understand how research subjects think, behave in accordance with what they do every day in their lives. This is done in-depth and continuously so that the researcher spends time with the subject under study. In this way, the researcher can really understand what is the meaning behind the behavior of the study subject.

To analyze the model and prove the factors that influence the sustainable construction approach, the researcher uses quantitative analysis with SEM models and PLS tools. PLS was chosen to be used by considering the amount of data analyzed, which is less than 100 respondent data. Thus, PLS is the right choice for calculating because it is more suitable and accurate for calculating data that amounts to less than 100 with a high level of accuracy.

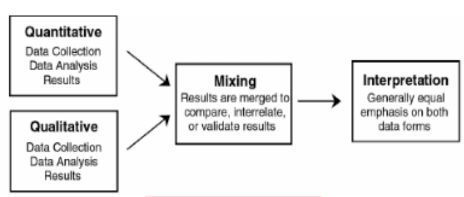

Figure 1. Mix method

3. RESULTS AND DISCUSSION

3. 1. Validity and Reliability Calculation Results

The results of the calculation of validity were carried out using the Convergent Validity test (Average Variance Extracted (AVE)). This technique is to measure the Average Variance Extracted value with the measurement value (Average Variance Extracted (AVE)) must meet the value of each variable, which is >= 0.5. see Table 1.

The result of calculating the Average Variance Extracted value shows that all the calculated factors have a value greater than 0.5. The results of the Discriminant Validity (Fornell Lacker Criterion) calculation are carried out to determine the value of the Discriminant Validity (Fornell Lacker Criterion) validity, which is the correlation value between the variable itself and variables with other variables, cannot be smaller than other variables. The valid value must be greater between the value of the variable itself and other variables. The results are summarized in Table 2.

The results of the calculations showed that the value of Counting Discriminant Validity (Fornell Lacker Criterion) has fulfilled the requirements of all the calculated variables. The value of validity is also continued by calculating the value of Discriminant Validity (Cross Loading) which is a validity test between the indicator value that measures the variable itself and the value of other indicator variables. The validity value must be greater than the indicator with other variables. The results of calculating Discriminant Validity (Cross Loading) the correlation between indicators and variables can be seen in Table 3.

TABLE 1. Average Variance Extracted

Variabel	Cronbach's Alpha	rho_A	Composite Reliability	AVE
X1 (EK)	0.833	0.838	0.888	0.666
X2 (LI)	0.895	0.918	0.922	0.702
X3 (SO)	0.784	0.702	0.859	0.604
X4 (PE)	0.865	0.883	0.902	0.648
X5 (IN)	0.857	0.874	0.902	0.697
X6 (SDM)	0.927	0.934	0.940	0.662
X7 (BU)	0.791	0.816	0.877	0.704
Y (SC)	0.831	0.832	0.887	0.664

TABLE 2. Value of Compute Discriminant Validity (Fornell Larcker Criterion)

Variabel	X1 (EK)	X2 (LI)	X3 (SO)	X4 (PE)	X5 (IN)	X6 (SDM)	X7 (BU)	Y (SC)
X1 (EK)	0.816							
X2 (LI)	0.649	0.838						
X3 (SO)	0.537	0.578	0.777					
X4 (PE)	0.562	0.782	0.605	0.805				
X5 (IN)	0.610	0.663	0.692	0.725	0.835			
X6 (SDM)	0.646	0.757	0.598	0.701	0.698	0.813		
X7 (BU)	0.439	0.526	0.434	0.523	0.482	0.652	0.839	
Y (SC)	0.512	0.481	0.400	0.568	0.444	0.568	0.543	0.815

TABLE 3. Value of Discriminant Validity (Cross Loading)

	X1 (Eco)	X2 (Env)	X3 (SOC)	X4 (Gov)	X5 (1N)	X6 (HRM)	X7 (Cul)	Y (SC)
BU3	0,367	0.031	0.349	0.438	0.329	0.492	0.842	0.440
BU4	0.323	0.369	0.392	0.391	0.537	0.507	0.795	0.373
BU5	0.405	0.531	0.361	0.479	0.380	0.628	0.878	0.532
EK1	0.860	0.593	0.429	0.482	0.527	0.499	0.289	0.404
EK2	0.797	0.413	0.345	0.388	0.484	0.460	0.250	0.388
EK3	0.782	0.520	0.503	0.508	0.552	0.600	0.414	0.393
EK4	0.823	0.581	0.469	0.457	0.440	0.547	0.458	0.475
IN1	0.461	0.602	0.584	0.684	0.850	0.593	0.424	0.398
IN2	0.470	0.474	0.535	0.621	0.793	0.499	0.292	0.266

IN3	0.457	0.419	0.598	0.469	0.850	0.534	0.384	0.353
IN4	0.628	0.675	0.589	0.640	0.845	0.672	0.472	0.430
LI1	0.640	0.864	0.611	0.761	0.618	0.704	0.465	0.524
LI2	0.471	0.838	0.335	0.602	0.467	0.569	0.297	0.316
LI3	0.561	0.859	0.401	0.606	0.455	0.587	0.476	0.375
LI4	0.470	0.808	0.561	0.668	0.527	0.617	0.448	0.381
LI5	0.536	0.820	0.443	0.595	0.686	0.665	0.492	0.358
PE1	0.256	0.470	0.347	0.763	0.376	0.438	0.322	0.427
PE2	0.506	0.656	0.476	0.866	0.558	0.631	0.477	0.569
PE3	0.486	0.715	0.584	0.822	0.744	0.631	0.515	0.467
PE4	0.559	0.701	0.497	0.809	0.633	0.576	0.355	0.442
PE5	0.446	0.606	0.559	0.761	0.624	0.527	0.429	0.334
SC1	0.313	0.231	0.146	0.431	0.247	0.361	0.383	0.809
SC2	0.337	0.321	0.247	0.419	0.289	0.375	0.336	0.882
SC3	0.464	0.472	0.425	0.499	0.424	0.477	0.446	0.795
SC4	0.510	0.493	0.434	0.479	0.446	0.587	0.556	0.769
SDM10	0.408	0.553	0.408	0.518	0.477	0.808	0.493	0.403
SDM11	0.499	0.659	0.477	0.578	0.570	0.879	0.580	0.518
SDM2	0.510	0.596	0.522	0.549	0.546	0.797	0.535	0.562
SDM3	0.567	0.633	0.514	0.566	0.575	0.812	0.506	0.382
SDM4	0.539	0.685	0.539	0.650	0.635	0.840	0.573	0.505
SDM5	0.617	0.617	0.512	0.648	0.615	0.828	0.596	0.416
SDM6	0.557	0.544	0.482	0.489	0.529	0.738	0.480	0.405
SDM8	0.524	0.625	0.425	0.555	0.588	0.798	0.465	0.446
SO2	0.519	0.481	0.763	0.453	0.515	0.469	0.270	0.320
SO3	0.482	0.464	0.818	0.567	0.649	0.474	0.336	0.260
SO4	0.292	0.378	0.812	0.396	0.471	0.472	0.365	0.382
SO5	0.417	0.510	0.711	0.514	0.564	0.446	0.388	0.246

The calculation results showed that the discriminant validity (Cross Loading) has met the requirements. The results of Computing Reliability (Composite Reliability and Cronbach's Alpha) are the results of Computing Reliability (Composite Reliability and Cronbach's Alpha) which are defined as the efficacy of the instrument in measuring the indicator value. Reliability Count Value (Composite Reliability and Cronbach's Alpha) must be > 0.7. the calculation results can be seen in Table 4.

The calculation results have shown that the calculated reliability value (Composite Reliability and Cronbach's Alpha) is greater than 0.7; so it can be said that the instrument is reliable and effective for use in research.

3. 2. Model Evaluation Results The results of the model evaluation are carried out by calculating several indicators as follows:

3. 2. 1. Model Evaluation Results: Inner Model Test (R-Square) The value of the Inner Model Test (R-

TABLE 4. Value of Compute Reliability (Composite Reliability and Cronbach's Alpha)

Variabel	Cronbach's Alpha	rho_A	Composite Reliability	AVE
X1 (EK)	0.833	0.838	0.888	0.666
X2 (LI)	0.895	0.918	0.922	0.702
X3 (SO)	0.784	0.702	0.859	0.604
X4 (PE)	0.865	0.883	0.902	0.648
X5 (IN)	0.857	0.874	0.902	0.697
X6 (SDM)	0.927	0.934	0.940	0.662
X7 (BU)	0.791	0.816	0.877	0.704
Y (SC)	0.831	0.832	0.887	0.664

Square) is a value that is only owned by the Y variable (Sustainability Construction). This value is a value that shows how much the independent variable (X1-X7) affects the dependent variable Y. The calculation results show that the value of Y = 0.457 x 100% = 45.7% is influenced by X1-X7. See Table 5.

3. 2. 2. Model Evaluation: Inner Model Test (Path Coefficients) The value of the Inner Model Test (Path Coefficients) is a value that shows the direction of the positive or negative variable relationship. The results of this calculation show the direction of influence of each X variable on the Y variable (Continuous Construction). The accepted value is at zero. If it is greater than 0 to 1, it means that it has a positive influence, whereas if it is less than 0 in – 1, it means that it has a negative influence. See Table 6.

The results of this study conclude the direction of the influence of the variables as follows:

- X1 (Economy) has a POSITIVE effect on Y (Sustainability Construction)
- X2 (Environment) has a NEGATIVE effect on Y (Sustainability Construction)
- X3 (Social) has a NEGATIVE effect on Y (Sustainability Construction)
- X4 (Government) has a POSITIVE effect on Y (Sustainability Construction)
- X5 (Investment) has a NEGATIVE effect on Y (Sustainability Construction)
- X6 (Human Resources) has a POSITIVE effect on Y (Sustainability Construction)
- X7 (Culture) has a POSITIVE effect on Y (Sustainability Construction)

These results indicate that the variables of the economy, government, human resources, and culture show a positive influence on sustainable construction. While the environmental and social variables show a negative influence. The factors that have a positive influence will have a positive impact on the implementation of sustainable construction projects in the Likupang SEZ. This can be a critical success factor in sustainable construction. Factors that have a negative effect can also be seen how they can have a negative impact on sustainable construction implemented in the Likupang SEZ.

3. 2. 3. Model Results: Inner Model Test (Significancy T-STATISTIC) The result of calculating the value of the Inner Model Test Evaluation (Significance T-STATISTIC) is a calculation result that shows the Significance value of a variable. This value can be seen in the results of the T-STATISTIC calculation which shows how significant the influence of the variable-on-variable Y is sustainable construction. The acceptance value is the significance level used alpha = 0.05 or the T-Statistic value > 1.96 = SIGNIFICANT. See Table 7.

The results of the calculation showed that the final results of the variable significance test are as follows:

Variable X1 (Economy) has a positive effect of 0.256 and a significant value of the T-statistic of 2.203 on variable Y (sustainable construction). This means that the economic variable has a positive and significant influence on sustainable construction. Thus, this factor must continue to be considered in the implementation of sustainable construction. The same thing happened to X4 variable, namely the government had a positive effect in 0.403 with a significant T-statistic value of 2.026 to Y variable, namely sustainable construction. This means that government variables must really be considered in sustainable construction. In the X6 variable (HR) the calculated results showed that the human resource factor has a positive effect of 0.189 on the sustainable construction variable, but has a T-statistic value of 1,078 which means that the HR factor is not significant on the Y variable. The same thing happened to X7 variable

TABLE 5. Inner Model Test Value (R-Square)

	R Square	R Square Adjusted
Y (SC)	0.457	0.405

TABLE 6. Value of inner model test (path coefficients)

Variabel	X1 (EK)	X2 (LI)	X3 (SO)	X4 (PE)	X5 (IN)	X6 (SDM)	X7(BU)	Y (SC)
X1 (EK)								0.256
X2 (LI)								-0.192
X3 (SO)								-0.008
X4 (PE)								0.403
X5 (IN)								-0.131
X6 (SDM)								0.189
X7 (BU)								0.264
Y (SC)								

TABLE 7. Model calculation results: Inner Model Test (Significancy T-STATISTIC)

	Original Sample (0)	Sample mean (M)	Standard Deviasi (STDEV)	T Statistics (O/STDEV)	P Values
X1(EK)·>Y(SC)	0.256	0.254	0.116	2.203	0.028
X2(LI)·>Y[SC)	-0.191	-0.160	0.197	0.972	0.331
X3(SOI·>Y(SC)	-0.008	0.004	0.166	0.047	0.963
X4(PE)·>Y{SC)	0.403	0.376	0.199	1.016	0.043
X5[1N)·>Y(SCI)	-0.131	-0.130	0.143	0.916	0.360
X6[SDM)·>Y(SC)	0.189	0.193	0.175	1.078	0.282
X7(BUI·> Y(SC)	0.264	0.249	0.139	1.$98	0.058
X1(EK)·>Y(SC)	0.256	0.254	0.116	2.203	0.028

(culture) has a calculated value of 0.264 which means it has a positive effect on the sustainable construction variable but is not significant on the Y variable because it only has a T-statistic value of 1.898. Thus, human resources and cultural factors do have a positive effect on sustainable construction but do not significantly affect the sustainable construction factor. This means that these two factors must be considered when implementing sustainable construction in Likupang SEZ. The opposite happened to X2 factor, namely the environment. The result of the calculation shows that the environment variable has a negative effect of -0.192 and only has a T-statistical value of 0.972 which means it is smaller than the standard T-statistical significance of 1.96. Thus, environmental factors only have a negative and insignificant effect on sustainable construction. In factor X3, namely social factors, the calculation results show a value of -0.008 which is smaller than 0 so it can be concluded that social variables have a negative effect on sustainable construction. While the T-statistic significance value shows a value of 0.047 which is smaller than the accepted value of 1.96 it is concluded that it is not significant for the sustainable construction variable. The same thing happened to X5 variable, namely investment. The results of the calculation show that X5 value is only -0.131 so it has a negative effect and only has a T-statistic value of 0.916 less than the accepted value of 1.96 so it can be said that it is not significant to the variable Y Sustainable construction. Thus, it can be said that both environmental, social and investment variables only have a negative effect on sustainable construction. This could be because Likupang SEZ development process with a sustainable construction approach still pays attention to the profitability value so that it still does not pay attention to the environment, social and investment.

The results of this study are in line with those stated by El-Mahdy, et al. [8] The use of building construction materials with a sustainable construction approach can reduce production costs so that they become more efficient and make construction materials by utilizing widely available sand and salt. On the other hand, the model fits with the local wisdom of Egyptian people. The material used is very supportive of climate change because it is environmentally friendly [9]. The findings focus on materials that support sustainable construction that can contribute to economic and environmental factors. Meanwhile, in this study, the researchers focused on a broader issue, namely the sustainable construction model. It is proven that economic and environmental factors have contributed to sustainable construction. The same thing was found by Nasereddin and Andrew [10] that the cost of capital is strongly related to the success of sustainable construction. The capital costs incurred with the sustainable construction approach provide better benefits and reduce operational costs so that costs become cheaper [11]. This model is well received in Jordan. These results are in line with what was found in this study, namely that economic factors in the form of capital have an influence on the implementation of sustainable construction.

In the process of reducing waste, researchers Liu, et al. [12] found that the BIM algorithm can be used to carry out simulations in proactive planning so that it can save materials and provide solutions for sustainable construction. This model can reduce material waste by enabling savings on material cutting for the roof shroud layout. This model can reduce material waste and cost-efficiency. This research provides adequate support for economic and environmental factors in this study. Thus, the economic factor has become one of the key factors in the successful implementation of sustainable construction. Other researchers have also shown that the use of excavated material, which is usually a construction waste, can be used as a construction material by utilizing a stable mixture of soil, aggregate, and water consolidated with high-velocity projections rather than mechanical compaction to obtain structural and non-structural elements [13]. Thus, the material can be utilized in the application of sustainable construction. This proves that the waste indicator is an indicator that contributes to environmental factors which can contribute to the implementation of sustainable construction.

The results of this study are in line with what was found by He and Chen [14], who found that the success of sustainable construction is closely related to the professionalism and experience of the project management team and a clear definition of responsibility has the highest driving force, which will also increase the likelihood of success and benefit the performance of sustainable construction projects. The findings give consideration that environmental factors are important to consider as one of the success factors of sustainable construction projects. These results strongly support this research because the professionalism factor is also a human resource factor which is the main finding in this study. The more professional HR involved in sustainable construction projects, the greater the chance of success of sustainable construction projects.

Another finding that strongly corroborates this research is that of Muheise and Pavia [15] who found that clay-based materials produce high-quality bricks that can be used in sustainable construction projects and can save more than 4 million euros in economic savings on kiln fuel and fuel. Carbon taxes in 10 years, and will be about half their carbon emissions, substantially reducing the global environmental impact of brick production. This shows that economic and environmental factors play an important role in the successful implementation of sustainable construction projects.

The use of environmentally friendly materials also has an effect on sustainable construction. Hashmi, et al. [16] findings found that a mixture of fly ash concrete made by replacing cement with fly ash in the range of 25% to 60% with an equivalent weight can make concrete that has a fly ash content of 40% have shown satisfactory performance at age. advanced (ie above 28 days) in terms of strength, modulus of elasticity, and deflection. This shows that environmentally friendly materials are a determining factor in sustainable construction which has been proven in this research.

The government factor is one of the findings in this study, this is related to the policies and regulations issued by the government to support the implementation of sustainable construction projects. This is in line with what was found by Nithya, et al. [17] who found that government support in sustainable construction projects in the form of a zero-waste policy has given a high attractiveness to the implementation of sustainable construction projects. The research shows that the Indian government has implemented a zero-waste strategy in the construction sector, which has successfully implemented sustainable construction in construction projects. This shows that the government factor is also a determining factor in the implementation of sustainable construction which is the finding in this study.

These studies show that the factors that influence projects with a sustainable construction approach are proven to have an influence on the success of sustainable construction projects. These factors include economic, environmental, government, and other factors. The results of this study are also in line with many findings from other researchers who also found research results that are in line with this research, especially on the topic of sustainable construction. There are those who research economic factors, environmentally friendly materials, and policies that can be made by the government.

3. 2. 4. Inner Model Test Results (Predictive Relevance) The results of the Inner Model Test (Predictive Relevance) are values to show how well the observations are made. The results of the Inner Model Test Predictive Relevance are calculated using blindfolding in PLS. Inner Model Test Predictive Relevance has an acceptable value of good observation value if > 0 it can be said that the observation is good (see Table 8).

The results of the calculation show that the results of the Inner Model Test Predictive Relevance show the value to be the conclusion of the observation 0.237. This means that the observations that have been made in this study can be said that the observations are good.

3. 2. 5. Inner Model Test Result (Model Fit) The results of this study have produced a model that was built to test whether the model that has been built is good or not. To measure the model, researchers used the Inner Model Test (Model Fit) (see Figure 2).

The Model Inner Model Test (Model Fit) is a value to determine how well the model being studied is. Acceptance value is measured using the value seen in NFI on PLS (see Table 9).

The calculation results show that the Model Fit value is the NFI value = 0.568. This means that the NFI value has shown that the model built has been good. The percentage of the model built is obtained by NFI x 100%,

TABLE 8. Inner Model Test Results (Predictive Relevance)

Variabel	SSO	SSE	Q^2 (=1-SSE/SSO)
X1 (EK)	324.000	324.000	
X2 (LI)	405.000	405.000	
X3 (SO)	324.000	324.000	
X4 (PE)	405.000	405.000	
X5 (IN)	324.000	324.000	
X6 (SDM)	648.000	648.000	
X7 (BU)	243.000	243.000	
Y (SC)	324.000	247.125	0.237

Figure 2. Model fit sustainable construction

TABLE 9. Nilai Inner Model Test (Model Fit)

	Saturated Model	Estimated Model
SRMR	0.092	0.092
d_ULS	5.948	5.948
d_G	3.595	3.595
Chi_Square	1266.411	1266.411
NFI	0.568	0.568

so that the percentage of the model built is obtained by NFI = 0.568 x 100% = 56.8% Fit model. This means that the sustainable construction model that has been built has 56.8% declared fit and can be implemented in sustainable construction in the Likupang SEZ.

This model is proven to be in line with the results of research put forward by Ristić, et al. [18] who also found that a sustainable construction model with a multi-criteria approach is a good model choice for the development of a sustainable construction model.

The results of this study prove that the model that has been produced can be claimed as a novelty. This novelty can be proven by the results of this study that it has succeeded in building a more holistic model with various factors that make up this sustainable construction model. This model shows that there are 8 (eight) factors that separately contribute to shaping this sustainable construction model. These factors are economic, environmental, social, government, investment, government, human resources, and cultural/local wisdom factors. These factors have been holistically tested with the results of the model fit test of 56.8% and can form a good model. The results of this test indicate that this model can be relied upon in forming a new sustainable construction model. These results can improve the previous model which only consists of 3 factors, namely economic, social and environmental. Thus, the results of this study can claim that improvements in the construction model are sustainable and can be implemented. The implementation strategy has also been successfully developed by conducting a comprehensive analysis, both internally by taking into account strengths and weaknesses and externally by taking into account current and future opportunities and threats. Thus, the holistic model of sustainable construction that has been produced can be implemented properly.

One of the factors that became interesting findings in this study was the findings on cultural factors/local wisdom. This factor was found to have an influence on the factors of sustainable construction. The successful implementation of sustainable construction must pay attention to cultural factors/local wisdom as an important factor. This finding has improved the previous findings, which only included cultural factors as indicators of social factors. Thus, there has been an improvement in these factors, and can be claimed as a novelty in this study.

The overall results of this study have been carried out with rigorous, valid, and reliable methods and analysis so that the results can be claimed as research findings. The resulting model has been legally proven as a holistic sustainable construction model. This is because the research has used 8 (eight) factors that make up sustainable construction comprehensively. Thus, it can be concluded that this model can be used to update the previous sustainable construction model which only contains 3 factors. The model of the findings of this study is a sustainable construction model that is holistic because it is formed from 8 comprehensive factors as evidenced by valid, valid, and reliable analysis and methods.

4. CONCLUSION

This study concludes that the factors that have been studied can form a model that is produced after fulfilling the requirements as a good model and can be used in the development of sustainable construction. The results of the evidence show that the model produced 56.8% of the model has been good to use. The factors that influence the model have contributed to the development of the model. Several factors have been shown to have a positive and significant effect, such as economic and government factors. While some factors are concluded to have positive factors such as human resource factors and cultural factors. Meanwhile, environmental, social and investment factors have a negative influence on the sustainable construction model in Likupang SEZ. The results of this research conclude that the resulting model can be directly implemented in the development of Likupang SEZ by paying attention to the factors that have a positive influence and stakeholders need to develop a mature strategy in anticipating factors that have a negative influence and maximizing the factors that contribute positively. so that it is hoped that the implementation of sustainable construction can be successful.

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Persian Abstract

چکیده

ساخت و سازهای پایداری در حال تبدیل شدن به کانون توجه در کشورهای در حال توسعه مانند اندونزی است. در اجرای ساخت و سازهای پایدار مشکلات زیادی وجود دارد که باید مورد توجه قرار گیرد. هدف از این مطالعه تجزیه و تحلیل عواملی است که بر اجرای ساخت و ساز پایدار در پروژه لیکوپانگ SEZ تاثیر می گذارد. روش مورد استفاده یک روش ترکیبی برای تعیین عوامل مختلفی است که بر ساخت و ساز پایدار تأثیر می گذارد. این تحقیق شامل ذینفعان مختلفی مانند پیمانکاران، مشاوران، دانشگاهیان، صاحبان شرکت ها، دولت و جامعه است. نتایج این مطالعه نشان می دهد که اقتصاد و دولت بر ساخت و ساز پایدار تأثیر مثبت و معناداری دارند. در این میان، عوامل نیروی انسانی و عوامل فرهنگی بر ساخت و ساز پایدار تأثیر مثبت اما معنادار ندارند. نتایج این مطالعه همچنین نشان می دهد که عوامل محیطی، اجتماعی و سرمایه گذاری بر اجرای ساخت و سازهای پایدار تأثیر منفی دارند. این مطالعه به این نتیجه می رسد که عواملی که تأثیر مثبت و معنادار دارند باید با اولویت دادن به نقش دولت در اجرای ساخت و سازهای پایدار که بر عوامل اقتصادی تأثیرگذار است، تقویت شوند، در حالی که برای کاهش تأثیر منفی عوامل مؤثر به یک استراتژی کافی نیاز است که تاثیر منفی بر ساخت و ساز پایدار دارد.

Study on the Application of Sustainable Construction in the Development of the Likupang Special Economic Zone

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