

PEST-SWOT ANALYSIS OF SUSTAINABLE COASTAL FISHING VILLAGE IN THE COVID-19 OUTBREAK - FOCUSING ON DAEHANG FISHING VILLAGE IN BUSAN**Li Suhui^{1*} and Cho Joung Hyung²**¹Ph. D. and ²Professor, Department of Marine Design Convergence Engineering, Pukyong National University, Busan 48513, Korea¹<https://orcid.org/0009-0009-9393-1819> and ²<https://orcid.org/0000-0003-1230-3909>¹lisuhui960906@gmail.com and ²jhcho7@pknu.ac.kr**ABSTRACT**

Objective: To study the strategies applicable to the sustainable development of Dahang fishing village in the post-epidemic era.

Theoretical framework: The sustainability of fishing villages is threatened by aging, population decline, lack of social infrastructure, hollowing out population due to the destruction of the marine ecosystem, loss of fishing infrastructure, and economic problems. Fishing villages, which are the foundation of Korean society, will disappear if they do not have a way to maintain their socioeconomic structure

Method: The method of the study is the PEST-SWOT analysis.

Results and Conclusion: PEST-SWOT analysis shows that society has the greatest influence on the development of fishing villages. Societal Threat is caused by the aging population and aging facilities. Focusing on the advisory function of the relevant regional committees before formulating relevant policies will help to improve the design and shorten the working time. They should focus on improving the income function of the local economy, maintaining their community function, welfare and recreation functions to cope with aging population, and public health and safety capabilities to prevent epidemics such as COVID-19.

Implications of the research: The fishing villages need to develop Tourism to improve their living environment. Aging population causes labor crisis so, Regional development is needed to draw in young people. It is important to open up fishing communities to develop fishing areas and to ensure opportunities for those who want to return to fishing. On the other hand, there is a lack of technical factors, which is reflected in the great threat of fishing villages, aging facilities, technical limitations, and other problems that constantly affect the economic development of fishing villages.

Keywords: Sustainable development, fishing village development, COVID-19 era, PEST analysis, SWOT analysis

1. INTRODUCTION

Korea, a country that is largely surrounded by water, has a lot of room to expand in terms of its humanities, economy, and special marine resources. However, the COVID-19 pandemic threatens the sustainable development of fishing villages. Sustainable development is the pursuit of the present era's future while taking into account the next generation, as well as the coordinated and balanced growth of society, the economy, and the environment. The sustainable development of fishing villages can also be defined as the harmonious and balanced development of society, economy, and environment in fishing villages, which are on the verge of recession due to aging, population reduction, and poor environment. The sustainability of fishing villages is threatened by aging, population decline, lack of social infrastructure, hollowing out population due to the destruction of the marine ecosystem, loss of fishing infrastructure, and economic problems. Fishing villages, which have become the foundation of Korean society, will disappear if they do not have a way to maintain their socioeconomic structure (Choi et al., 2021; Risi and Schipani, 2018; Yoon and Kim, 2019). In order to achieve sustainable development, sufficient scientific knowledge is needed in all fields of state, regional and social community units. In other words, it is necessary to conduct economic cooperation research to understand the sustainability of fishing villages, as the fishing community also needs to diagnose and accumulate sufficient knowledge of the current

situation. The sustainable development of fishing villages can be realized by grasping the actual conditions and present conditions and objectively judging the regional characteristics. Based on the analysis of the characteristics of fishing villages, the sustainability of fishing villages can be realized only when the long-term development plan and business plan are evaluated. In addition, the COVID-19 pandemic (global pandemic) outbreak in 2020 has had a different impact on various industries. There have been plenty of well-publicized stories about how COVID-19 is disrupting industries like airlines, Add a restaurants and sports, but the virus is also reaching out to the oceans and affecting our "blue economy." In some areas, COVID-19 has reduced shipping activity by 30 percent. Lockdown measures and falling demand for seafood have led to an 80 percent drop in fishing activity in China and West Africa. Entire countries that depend on ocean and beach tourism have closed their borders. Globally, the impact of COVID-19 on tourism could cost \$7.4 billion and put 75 million jobs at risk. With the pandemic hitting tourism particularly hard, \$4 trillion will be lost between 2020 and 2021 alone due to travel restrictions, inadequate containment of the spread of the virus, low tourist confidence, and a weak economy. This blow is significant given the significant economic losses suffered by the community and its citizens. This will not only impede national progress but also lower people's standards of living. Therefore, people should respond to the call of the country and face the impact of COVID-19 with a positive attitude. Both society and the government should take measures to deal with COVID-19. For the fishing village, it is very important to prepare for the environmental changes after the outbreak of the epidemic, realize the new leap of fishing village tourism, analyze the trend, and put forward countermeasures (Kim et al., 2021).

The social environment affected by the epidemic is not optimistic, but we should face it positively and embrace social recovery. Through the analysis of the results of this study, each subject can be used flexibly. It provides meaningful data and analysis grounds for policy development related to marine tourism and management of fishing village experience recreation villages. In particular, if big data can be easily obtained and used through systematic improvement, not only the marketing and tourism industries but also the entire industry will be able to change the paradigm. Therefore, more efficient use of fishing village space is necessary. In the face of the problem of inducing sustainable fishing villages. The purpose of this study is to find a sustainable development strategy for fishing villages after the COVID-19 outbreak, in order to cope with the changes in fishing villages.

7.1. Scope and Methods of the Study

The methodology of the study is the PEST-SWOT analysis model established by combining PEST analysis and SWOT analysis, which can be implemented under the condition of sustainable development. This study, is an interdisciplinary collaborative study that combines design application with the problems reflected in a contemporary social environment. The survey data were examined using a combination of the basic information survey of the fishing village and the study of the activation plan in the post-epidemic era of the fishing village. The basic analysis of the research was completed by advanced theoretical research. Finally, the conclusion was drawn in Figure 1.

The research scope of this paper is Daehang Fishing Village in Gadeokdo, Busan. The survey period is from early July 2022 to late August 2022, and it includes information on the gender, age, inflow and origin, time zone, and the number of visitors to fishing villages (monthly trend).



Fig. 1: Study flow charts

8. Prior Research for Modeling

8.1. Understanding Coastal Fishing Villages

8.1.1. Definition of Coastal Fishing Village

The concept of a fishing village is defined in Article 3 of the Basic Law on the Development of Fisheries and Fishing Villages. The fishing village refers to an area near a river, lake, or sea, or behind a fishing port, where fisheries are the main living areas. Commercial and industrial areas are excluded from the area. The dictionary meaning of "fishing village" refers to a village where people live mainly in the sea, rivers, and lakes depending on fisheries (Han et al., 2013). The natural characteristics of the East Sea, South Sea, and West Sea, which make up the coasts of the country, vary considerably from coast to coast. Due to the difference between the natural environment and the humanistic environment, the experience programs of local fishing villages are different. Experience activities such as sunning seaweed are increasing in Korea's East Coast Fishing Village, which has a high proportion of scuba diving experiences. However, the diversity of coastal-related projects is somewhat insufficient compared to the South China Sea and the West Sea. Due to the large percentage of market experience and seafood collection, there are two programs in operation, such as salt field experience and crab fishing experience. The South Coast is similar to the West Coast, and relies heavily on tourists to gather seafood. The semi-agricultural and semi-fish villages are well developed, providing not only fishing village-related experiences, but also agricultural and craft-related activities. South Coast Fishing Village is a mixture of the East Coast and West Coast[5]. Seafood collection and tourism experiences vary greatly depending on regional traits and coastal resources, and several programs, including salt field experiences, kelp and kelp collecting experiences, and weed experiences are also performed. It can be seen that the sustainable development of coastal fishing villages in Korea depends on production and on commercial activities related to leisure experience (Seo & Jung, 2020).

8.1.2. Current Status and Problems of Coastal Fishing Villages

By type of port, the national fishing port (4.8%), local fishing port (12.7%), fishing village settlement port (27%), and small port (55.5%). By region, the fishing population and fishing forces were concentrated in South Jeolla Province (47.8%), South Gyeongsang Province (24.7%), North Gyeongsang Province (5.7%), and South Chungcheong Province (4.6%). Korea's coastal fishing villages are distributed in 74 cities, counties, districts, 492 towns, myeon, and dongs, accounting for 16.8% of the country's total area and 9.8% of the nation's population of 52 million. A total of 1023 fishing ports, including state fishing ports, remain the same every year, with 1276 illegal small-scale ports and docks. The importance of the economic development of coastal fishing villages in Korea can be seen by looking at the area and population ratio of coastal fishing villages (Choi and Yeo 2022). In recent years, however, the total population of fishing villages and the population of fishing families have been decreasing by an annual average of - 4.6%. Due to the aging population and low birth rate, about 58% of 492 eupon-dong districts in fishing villages are classified as areas at risk of disappearing. In addition, fishing villages have a relatively poor living environment compared to inland areas due to their high number of old houses and low standard of living services such as medical, transportation, and cultural facilities (Yoon, et al, 2013). There are one million old houses in fishing villages (19.3% of the total number of houses in fishing villages), and the number of empty houses is increasing due to the decrease in the population. Tourism conditions in fishing villages are affected by the lack of labor force in fishing villages, outdated experience facilities, poor experience environment, and insufficient cultural information, showing the limitations of attracting tourists.

8.1.3. Impact of the COVID-19 pandemic on Coastal Fishing Villages

According to the survey, the current diversification of public facilities in fishing villages is due to the increasing demand for income functions as public services. This means that there is a growing need to create new sources of common income in addition to maintaining the fishing activities of the fishing community in the current social crisis facing the fishing community, such as the decrease in fishing catches, the decrease in population, and the aging of the population. Combined with the era of outbreaks, limiting the people's travel, leading to the experience of coastal fishing village project benefit is reduced, and the like in the coastal fishing village of the stream of public space, in the fishing village of basic public services to maintain community social function and quality of life and related important public serving the public welfare, entertainment and the consciousness of health and safety is also essential. These public facilities are required to maintain a fishing village community, the community function and provide support for functional core facilities of fishing activities, is considered to be provided, and coastal fishing village life is directly related to the public service facilities. The public share hall, office, warehouse, and the demand for the fishery person room are necessities for the main coastal fishing village society. In addition, in this context, it is considered that these public facilities are suitable for the operation and management of fishing villages (Cho, 2020). In terms of the types of income facilities, coastal fishing villages have increased demands on the safety performance and functionality of aquatic products refrigerated storage, comprehensive multifunctional facilities, experience facilities, and accommodation facilities in fishing villages. These types of common facilities are necessary to diversify the income of fishing villages, and they are needed facilities with more demands from the community of fishing villages, so they are considered relatively suitable for the operation of fishing villages.

Since 2020, the COVID-19 pandemic has spread rapidly around the world, hitting all walks of life to varying degrees. For coastal fishing villages, in the epidemic era, agricultural production is largely completed by fixed fishing village villagers because there is no need for large-scale population flow. Therefore, agricultural production is not greatly affected. However, leisure tourism, such as fishing village experience facilities, fishing village accommodation, and fishing village catering, has been severely affected by the epidemic due to the large number of people required (Kim 2019).

The fishing village's inherent potential for tourism resources, such as the fishing port behind the coastal fishing village, is being severely tested for the development of a balanced development level of policy change, in light of the ongoing population decline and aging of fishing villages, reduction in marine resources, and deterioration of

fisheries and aquaculture conditions. Therefore, it is necessary to observe the trend of the plan to revitalize fishing villages through this study, and to draw up a research plan that can be developed through the connection of culture, society, culture, and politics with coastal fishing villages in the development of sustainable fishing villages (Ahn and Lee, 2022).

8.2. Analysis of Influencing Factors and Necessity

Indicators of sustainable development in fishing villages can be defined as a means of assessing the status and sustainability of fishing villages in order to achieve harmonious and balanced social, economic, and environmental development. To improve social sustainability, population and regional communities should be sustainable. The economic development of coastal fishing villages in South Korea was affected by tourism, and among the industries seriously affected by the epidemic, tourism ranked first (Ann and Lee, 2022). After the outbreak of the epidemic, it was necessary to study the impact of the epidemic on coastal fishing villages. Considering the current situation of coastal fishing villages, it is the backward development direction of coastal fishing villages to stop the loss and prevent the disease according to the impact of the epidemic on coastal fishing villages.

As fishing areas are sustainable through efficient operation of fishing farms, regeneration of fishing ports, increased competitiveness of the fishery industry, and creation of new sources of income and jobs, the industry and economic sectors should be revitalized. In particular, it is important to ensure the sustainability of the Marine and dry environment sector, as fishing villages are experiencing a decline in aquatic resources due to the deterioration of the Marine environment, and their accessibility and infrastructure conditions are relatively lower than those of urban and rural areas, threatening the possibility of sustainable development. In addition, every disease is a reminder of public health safety. The outbreak of the COVID-19 pandemic has also reminded people that health security is not to be ignored in all walks of life. Therefore, the balanced development of the social, economic, and environmental ministries is considered necessary to ensure the sustainable development of fishing village areas. An index is a crucial tool for measuring the current situation, the level of development, and target achievement. In order to comprehensively diagnose and evaluate fishing village areas, it is necessary to develop indicators that can grasp the level of backwardness and decline of population, society, and economy, grasp the problem points of fishing village areas, and judge the possibility of sustainable development of fishing village areas. Therefore, this study aims to explore sustainable development as a new countermeasure and puts forward proposals for sustainable development of coastal fishing villages in the post-epidemic era.

As of November 9, 2022, 636,652,324 people have been confirmed to have COVID-19 and 6,609,325 have died. In South Korea, 29,420 people have died since the outbreak of COVID-19, out of a total population of 52 million, and the death toll is still rising (Table 1) (Figure 2). According to the research data, the death rate from COVID-19 has reduced the population, which will lead to a shortage of labor force, especially in fishing villages where economic development depends on the labor force, which will be severely affected by COVID-19. Not only that, the COVID-19 pandemic has restricted people's travel, resulting in a decline in economic benefits, increased safety awareness has led to an increase in production costs, and the panic caused by the COVID-19 pandemic. This calls for us to prepare for the post-COVID-19 economic recovery and develop strategies to cope with the economic development under the COVID-19 pandemic.

First, the economic structure of rural areas is weakening due to the lack of productive manpower due to the decreasing population due to the death rate of COVID-19. Secondly, under the influence of the social environment, it is also faced with ecological risks such as natural disasters, agricultural working environment, backward living environment, the risk of becoming the object of crime, and other economic problems induced by the environment, society, and culture. Third, after the outbreak of the COVID-19 pandemic, passenger traffic has been greatly reduced. In the post-pandemic era, coastal fishing villages should prepare for a rebound in passenger traffic. Moreover, the COVID-19 pandemic has reminded people of the necessity of public health and safety awareness in public environments, regardless of the industry.

Table 1: The COVID-19 situation in the world and South Korea

	Number of confirmed cases (unit: person)	Number of deaths (unit: person)	Mortality rate
Around the world	636,652,324	6,609,325	1.04%
South Korea	25,919,183	29,420	0.11%

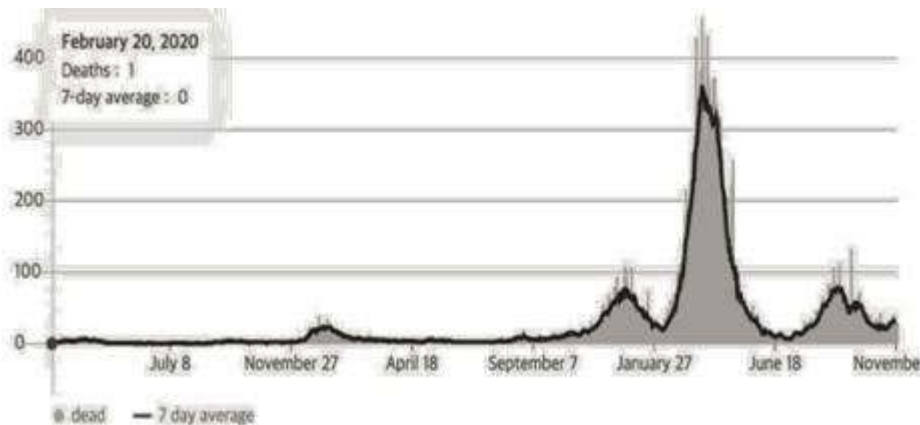


Fig. 2: The growing trend of COVID-19 in South Korea

Source: <https://news.google.com/covid19/map?hl=ko&mid=%2Fm%2F06qd3&gl=KR&ceid=KR%3Ako>

9. RESEARCH METHODOLOGY

9.1. Research Design

In order to satisfy the rationality and effectiveness of the research design, the site selection of the research site is based on the fishing village of Busan, South Korea. As a country mostly surrounded by seawater, the development of the Marine economy cannot be ignored. Daehang Village is located in Gadeok Island, South Korea's second-largest city Busan. The image of Daemok can be seen from the top of Yeon-daesan Island, so it is called Daehang Village.

Gadeok Island is located in the south of South Korea and has a large sea area. According to the Special Act on Gadeok Island New Airport issued by the Busan City government in 2021, the basic plan is expected to be completed by 2023, which will solve the polarization problem in the Seoul metropolitan area, cope with the temporary problems of Incheon International Airport, and the successful hosting of the Busan World Expo in 2030. As an international tourist city, Busan can stimulate the regional economy. Therefore, the study on the Daehang fishing village located on Gadeh Island is of reference value for the sustainable development of the fishing villages in the era of COVID-19.



Fig. 3: Satellite map and schematic diagram of Busan Daehang fishing village

3.2 Respondents

A portion of observation units is chosen as samples from the entire population using a purely random sampling technique, meaning that each observation unit has the same chance of being chosen as a sample during the survey of the Daehang fishing village. First, all the observation units in the population are numbered, and then a part of the observation units are selected to form a sample by drawing lots, a random number tables, or generating random numbers by computer. Although the simple random sampling organization work is not easy to carry out, but its advantage is simple and intuitive, easy to calculate the mean. The development of Daehang fishing village is not only related to the behaviors and activities of local fishermen, but also has reference value for the development of the fishing village based on the views of tourists visiting the fishing village. Therefore, the survey objects mainly include two groups: one is the local fishermen of Daehang fishing village; the other is 100 tourists visiting Daehang fishing village during the survey period. The investigation process was carried out by questionnaires. Firstly, 24 questionnaire options with 16 keywords were developed. In each of these two groups, a random sample of respondents received questionnaires, which were then distributed, retrieved, and the data gathered.

9.2. Instrument

The survey tool of this study is the questionnaire used in the survey. Of the factors involved in the questionnaire consists of PEST, SWOT combination of P, S, P - W, P, O, P - T, E, S, E, W, E - O, T, E - S - S, S, W, S, O, S, T, S - T and T - S, T, W, T, O, T, T - 24 questionnaire options expanded by 16 keywords. PEST analysis model is a basic tool for macro environment analysis in the world. SWOT analysis includes strengths, weaknesses, opportunities, and threats. Using PEST and SWOT analysis methods to build the PEST-SWOT model matrix means combine the current macro environment such as politics, economy, society, and technology with strengths, weaknesses, opportunities, and threats to get different competitive strategies.

9.3. Procedure

The questionnaire was compiled and collected in the fishing village of Daehang. The survey was conducted from the beginning of July 2022 to the end of August 2022. COVID-19 still exists in Korea during this period. However, due to the policy of opening up, activities in many areas are not restricted by COVID-19. To ensure the

validity and objectivity of the questionnaires, 100 respondents were surveyed, and the data was gathered in real-time. The importance of keeping the questionnaire's contents confidential was explained to the respondents after the questionnaire was finished, and the requirements for keeping the contents confidential were required. This is because the questionnaire has the research content of analyzing the responses provided by the respondents.

10. MODEL DEVELOPMENT

10.1. Survey Model Content

Through case studies and participant observation, the study outlines the possibilities of sustainable development and makes recommendations for assessing the current state and development potential of coastal fishing villages within the context of the COVID-19 era. The sustainability indicators of coastal fishing village development units are economic, social, and environmental conditions, and are discussed and studied in order to overcome the crisis in the presence of various inherent dangers of human and current conditions.

PEST analysis mainly analyzes the macro environment of the research object, including the political, economic, social, and technological aspects of the research object. SWOT analysis, also called situation analysis, is a strategic analysis method, which mainly includes strengths, weakness, opportunity, and threats. SWOT is a qualitative analysis method, concise and easy to understand. It is widely used. Through the clever combination of PEST and SWOT, the PEST-SWOT model is established, and the advantages and disadvantages focus on the main analysis of coastal fishing village reconstruction; the opportunity threat focuses on the influence and evaluation of the external environment (Chen and Ma, 2019). The advantages and disadvantages, opportunities, and threats of the fishing village reconstruction plan are realized through PEST analysis, and corresponding strategic countermeasures are put forward. The PEST-SWOT analysis method can play a more auxiliary role in the investigation and research, and obtain more comprehensive research results. The basic direction of the development strategy of fishing villages is to improve the living environment of backward fishing villages through tourism, and to make contributions to the revitalization of fishing villages from the perspective of increasing fishermen's income. The goal of building scenic spots is to improve the quality of life of residents in fishing villages, meet tourists and maintain a clean fishing village environment at the same time. According to the option classification of PEST-SWOT, 16 SWOT keywords about PEST are analyzed in Table 2 (Lee and Seo, 2021).

Table 2: SWOT keywords about PEST

Key worlds	Political	Economic	Social	Technological
Strength	Policy support (P-S)	Diversification (E-S)	General Trends (S-S)	Progress in Technology (T-S)
Weakness	Imperfect policies (P-W)	Affected by epidemic (E-W)	Population Aging (S-W)	Aging Facilities (T-W)
Opportunity	Sustainable Development (P-O)	Coping Strategies (E-O)	Sustainable Development (S-O)	Green and efficient (T-O)
Threat	Affected by economic (P-T)	Damage reduction (E-T)	Negative evaluation (S-T)	Security issues (T-T)

S- Strength, W-Weakness, O- Opportunity, T- Threat.

Political-1, Economic-2, Social-3, Technological-4

10.2. Research Model

Table 3: Descriptives

Keywords	Statements	Mean	Code
P-S	National policies to support and open fishing villages	0.213	S3
P-W	The imperfection of national policies	0.232	W3
P-O	Policy improvement in the post-epidemic era	0.266	O2
	To improve the environment of existing fishing villages		

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	Policies to support the introduction of young talents and labor force		
P-T	Politics is influenced by economics	0.224	T3
E-S	To develop a diversified economic community and develop the characteristic economy of fishing villages	0.257	S2
E-W	The scope of economic development of fishing villages is limited	0.372	W1
E-O	Creating a fishing village Foundation to deal with emergencies like COVID-19	0.182	O4
	Supporting township enterprises in fishing villages		
	Increase economic income outside the fishing industry		
E-T	The development of fishing villages has been affected by the COVID-19 pandemic	0.273	T2
S-S	Cultural development is supported by people and policies	0.403	S1
S-W	Labour shortage due to COVID-19 mortality	0.244	W2
S-O	Developing a people-centered social culture	0.342	O1
	Demarcation of fishing grounds and clarification of the use of fishing vessels		
	Medical facilities will be improved		
S-T	There are negative evaluations and influences in society	0.282	T1
T-S	With the development of The Times, technology is constantly improving	0.127	S4
T-W	There is a problem of aging facilities in fishing villages	0.152	W4
T-O	Update public facilities and pay attention to post-pandemic health and security issues	0.210	O3
	Rich fishing village traffic, meet the flow of population		
	Developing green and energy-saving technologies		
T-T	To develop a diversified economic community and develop the characteristic economy of fishing village	0.221	T4

Sixteen keywords were used to develop the survey content and make the questionnaire. Since there are many fishing villages in South Korea, it is very difficult to analyze each fishing village. There are a lot of data and it is not easy to analyze. Consequently, a single object is chosen for an in-depth, comprehensive investigation. Respondents' addresses are for Daehang Fishing Village in Gadeokdo, Busan, which is a coastal fishing village in the south that is simultaneously growing its agricultural, and Busan city, a tourist destination, which is also continuously developing all forms of tourism and leisure.

With Daehang Fishing Village as the center, a survey of 20 fishing village of villagers to understand the current situation of the fishing village and existing problems, and the survey of 80 went to fishing village experience object analysis of the fishing village of improvement measures, comprehensive data, analysis, and conclusion. The respondents selected the importance of SWOT of the PEST model respectively, and then analyzed the PEST index in SWOT respectively (Table 3.).

10.3. Survey Data Analysis

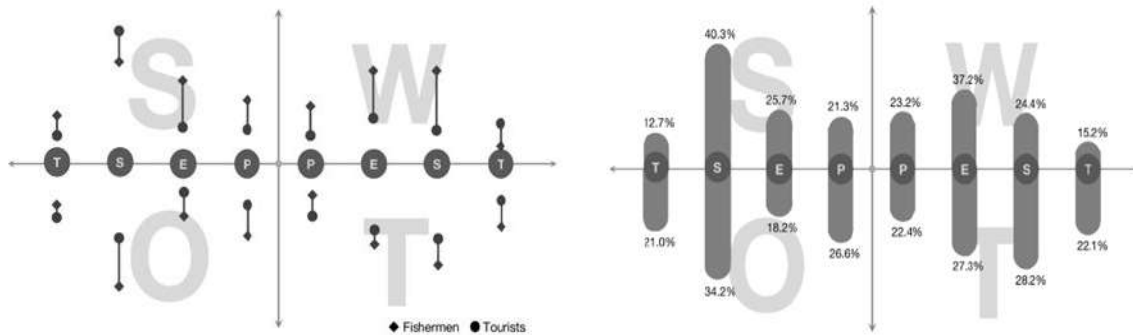


Fig 4: Data Analysis Diagram

The data is visualized, as shown in Figure 4. The center radiates outward. The horizontal axis represents each element of PEST, and the vertical axis represents the value. Figure 4 top half shows the average value after the integration of the two groups. The larger the bar is, the more important the survey respondents think this item is and the more important it should be paid attention to in the development of fishing villages dealing with the COVID-19 pandemic. The data show that S-S presents the trend of the most important factor in the questionnaire survey. Judging from this, in the social environment, the most important thing is to put people at the center and formulate corresponding measures to support economic development. The bottom half of Figure 4 shows the corresponding values of the two groups included in the survey, fishermen, and tourists respectively. The interval composed of the values of the two types of objects represents the different views of the two types of objects. The shorter the interval, the more consistent the opinions of the two types of objects are; the longer the interval, the more different the opinions of the two types of objects are. Respondents were most consistent on E-T, with both fishermen and tourists saying that the development of fishing villages is affected by COVID-19.

The basic direction of fishing village improvement through tourism is to improve the living environment of backward fishing villages through tourism, and make contributions to the revitalization of fishing villages from the perspective of fishermen as the center. Building sites of the goal of the implementation at the same time improve the life quality of village residents, meet the demand of tourists, and maintain the health and safety of the fishing village environment. Due to the aging population, the district economy faces a labor crisis. Regional development is urgently needed to draw in young people, and it is also vital to concentrate on regional industry growth to generate income. In addition, how local residents enjoy the quality of life when they settle in a convenient environment can be measured by the degree of residence and living foundation. Therefore, it is necessary to continuously care for and improve living conditions. The decline of fishing villages is deepening due to the closed nature of industry and economy, limited jobs, poor housing conditions, and closed community culture. The results of the analysis of the importance of the development of sustainable development indicators also show that it is important to open up fishing communities in order to maintain and develop fishing areas and to ensure opportunities for those who want to return to fishing, such as urban residents, to engage in a variety of fisheries. In order to improve the quality of life in fishing areas, it is necessary to provide settlement support for returnees and new residents in fishing areas, expand the outdated living service infrastructure, and improve the living environment such as aging and inconvenient houses. Additionally, increase the income of fishing villages, to generate income from outside fishing village 6 products like fish, but also foster fishing village entrepreneurial employment, through the tourism activity of fishing village in specialized and version number by interests multilateral fisheries, attract private investment in the fishing port and infrastructure to expand the revenue base. Only through such policy support and arduous work, can the fishing village's income base be expanded.

According to the survey data, among politics, economy, society, and technology, the importance of society (S) is considered the most important by the people, while in the SWOT of social factors, the opportunity to develop

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social factors (S-O) should be seized under the premise of the advantages of the current situation (S-S). On the other hand, there is a lack of technical factors, which is reflected in the great threat of fishing villages, aging facilities, technical limitations, and other problems (T-T) that constantly affect the economic development of fishing villages. To seize the opportunity for fishing villages' development (T-O), the COVID-19 pandemic can be used to update the outdated technology of fishing villages.

11.CONCLUSIONS

Most of the fishing villages and ports in South Korea with the geographical characteristics of the peninsula have many problems, such as the fragile proximity and livelihood environment, backward settlement environment, the accelerating decline and aging of the fishing population, and the COVID-19 pandemic has hit all industries to varying degrees. Therefore, it is inevitable to cope with the active development of fishing villages in the post-epidemic era. Besides, fishing villages are rich in sea, island, Marine leisure, fishing port, aquatic resources, beautiful natural landscape, and other kinds of growth potential, which can promote the local economic activity of basic infrastructure and the actual situation of insufficient content. The development of a place involves the politics, economy, society, and culture of the place. In addition, it is necessary to analyze the advantages, disadvantages, opportunities, and threats of the development of fishing villages. Therefore, the PEST-SWOT model is used to analyze and put forward the development strategy for fishing villages. Due to the lack of a thorough and precise understanding of how fishing villages evolve, each fishing village will depend on the following 16 factors. The following paragraphs assess the political, economic, human, and social advantages, disadvantages, opportunities, and threats facing fishing villages: P, S, P - W, P, O, P - T, E, S, E, W, E - O, T, E - S - S, S, W, S, O, S, T, S - T, and T - S, T, W, T - O, T-T.

The analysis model analyzes the development of fishing villages horizontally and vertically. From the perspective of horizontal analysis, the comprehensive analysis shows that, among the four factors of policy, economy, society, and humanity, society has the greatest influence on the development of fishing villages, and the current advantage of society is prominent among the social influencing factors. The current social environment has created favorable conditions for the development of fishing villages, coupled with opportunities for social development, such as the awareness of prevention in the current era of COVID-19 to create a healthy and safe environment in the future, which will contribute to the future development of the post-pandemic era. From the perspective of the longitudinal analysis of the model, the biggest advantage in the development of the post-epidemic era is social factors, followed by economic development, and the existence of opportunities is also the most important social aspect. For the sustainable development of fishing villages in the conditions, the existence of shortcomings belongs to the economic level, for example, the economic development of many factors is limited. In addition, the development of fishing villages is also under threat from the social level, which is caused by the aging population and aging facilities. In addition, the plan to focus on the advisory function of the relevant regional committees before formulating relevant policies will help to improve the design and shorten the working time.

In the future, sustainable development of fishing villages should focus on improving the income function of the local economy, maintaining the community function of the fishing village community, welfare and recreation functions to cope with aging population, and public health and safety capabilities to prevent epidemics such as COVID-19. Based on the need for such public services, the government will build public facilities suitable for each fishing village and make efforts to maintain the fishing community through the successful operation of related public facilities.

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Authors' Contributions

All authors contributed toward data analysis, drafting and revising the paper and agreed to be responsible for all the aspects of this work.

Declaration of Conflicts of Interests

Authors declare that they have no conflict of interest.

Data Availability Statement

The database generated and /or analysed during the current study are not publicly available due to privacy, but are available from the corresponding author on reasonable request.

Declarations

Author(s) declare that all works are original and this manuscript has not been published in any other journal.

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