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TECHNOLOGY-BASED MARINE WORKERS BUSINESS SYSTEM: THE POTENTIAL OF THE SLEREK SYSTEM SPRINGS AS A MODEL

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ABSTRACT

The problem of poverty in fishing communities has become a cultural cycle. The issue has become a long causal chain of various aspects that is difficult to unravel over the years. The number of fishers is decreasing while the potential of marine resources has not been fully explored. It happens because poverty alleviation for fishing communities is only around 1% per year. The poverty alleviation program is closely related to the empowerment of fishing communities in running their businesses. So far, the fishing community's business problems have focused on weather/climate, infrastructure, technology (very little touched/used), and capital. However, not all fishing communities are not prosperous. There are different levels of exploration of marine potential in other areas. The Muncar fishing community is included in the successful category with Indonesia's second-largest business scale. The Muncar fisherman's business system, although applying the general Juragan-Worker method, has a traditional fishing method called Slerek, a boat system in pairs, one for fishing, the other providing accommodation. The Slerek system promises optimal catch. The catch-sharing system is 50:50 for the skipper and his group of workers. The Muncar fishing community business system can be adopted into an empowering marine worker business system after several modifications and adjustments have been made regarding the remaining problems.

Keywords: business system, technology, marine worker, fisherman, Muncar

INTRODUCTION

Indonesia's marine waters are 5.8 million km2 (75% of the total area), consisting of 0.3 million km2 of territorial waters, 2.8 million km2 of archipelago seas, and 2.7 million km2 of the Exclusive Economic Zone (EEZ). An EEZ is an area of a country's marine exploration rights, measured 200 miles from the coastline. These rights include all the natural resources contained therein, applying the law of the sea, the free navigation of flights, or planting pipes and cables at the bottom. It is a significant fishery resource. However, this potential has not brought prosperity to the fishing community. It is known that 50% of fishing communities are still categorized as poor. In 2008 (BPS, 2009), the number was still 63.47%. It means that the poverty alleviation of fishing communities is only 1.2% per year. Fisherman jobs are getting less and less desirable (Jayani, 2021), and only 10% of villages in Indonesia live on the coast, although the length of the coastal area reaches 81 thousand kilometers (Solihin, 2010).

The problems (poverty) of fishing communities can be categorized into five scopes, namely issues (1) related to weather/climate, (2) changes in sea conditions caused by humans, (3) low technological mastery, (4) limited infrastructure, and (5) availability of financial capital (Mirajiani et al., 2014). In addition, there is also the problem of illegal fishing, which is carried out in an organized manner by cross-country networks (Solihin, 2010). Most fishing communities experience these problems, but this is not the case in some areas. There are differences in fishers' potential for exploration of marine resources (Royandi, 2019). Specifically, East Java has the third-largest fishing community in Indonesia (Jayani, 2021), the characteristics of fishing ports in East Java are different. The fish port in Muncar Banyuwangi has different characteristics and welfare levels compared to Sendang Biru, South Malang (Finahari et al., 2021). Physically, Muncar's fishing boat fleet is much better than Sendang Biru and its trading activities. It shows the potential of the fishing community to live in prosperity. The provisional assumption is that the difference is the business model run in the Muncar fishing community.

A preliminary study conducted by Finahari et al. (2021) shows that the Muncar fisherman's business system is organized in groups and has a good work structure. One reason for choosing the Muncar fishing business system is the study's reference. In their system, the fishing results will be divided into proportions according to the scope of work in the group. This characteristic distinguishes them from other fishing communities, who generally work in one boat. The Muncar fishing working group consists of 2 slerek ships - husband and wife. The husband's boat looks for fish; the wife provides accommodation for all the workers. The number of workers in one fleet ranges from 80-to 100 people. The fishing period can reach 20 days. It offers optimal working results. The Slerek system is what distinguishes it from fishing communities in other areas.

The fishing communities that focus on research are those categorized as traditional fishermen. Fishers are divided into four levels (Satria, 2015): traditional, advanced, commercial, and industrial fishermen. The majority of Indonesian fishers are still at the conventional and refined level. The Muncar area has all four levels of fishermen, although the commercial and industrial classes are still limited.

Research on fishing communities generally revolves around the problem of poverty and its alleviation (Dahuri, 2010). (Satria & Kusumastanto, 2009); (Mirajiani et al., 2014); and (Royandi, 2019). (Hamdani & Wulandari, 2013) states that the source of

poverty in fishing communities lies in differences in resource and technology mastery, quality of education, temporary luxury living habits, not having a side job outside the fishing season, and ownership of financial capital. The general solution offered for this is the involvement of financial institutions (Rostin, 2016) and the formation of KUD Fishermen (Triyanti & Firdaus, 2016). Identify and evaluate the structure and (Juliantono & Munandar, 2016) poverty alleviation programs of fishing communities that are not well-targeted. These programs are seen as confirming the existence of the poverty circle. It is in line with (Pujiyanto, 2016) research on the distribution of fishing gear that is not well-targeted. However, the government has continued to improve the program targeting system since 2011 (Deputi Seswapres, 2011).

Fishing communities have also adapted aspects of changes in marine ecology to survive. The adaptation process is believed to have had a significant impact on the level of the economy (Helmi & Satria, 2012). The strategic method chosen is according to the ability of each fishing household unit, namely increasing income sources, utilizing social relationships, mobilizing family members, varying fishing gear, changing catchment areas. Even illegal logging in mangrove forests and relying on assistance from various parties.

In the legal field, the problem of illegal fishing organized by cross-country networks mentioned Solihin (2010) is also mentioned in the research material. Illegal fishing in Indonesia's marine areas has harmed the country financially on a large scale. Modern technology in the fishing system owned by these illegal fishers is at the industrial level, where fish canning can be done instantly on the spot. In addition, traditional Indonesian fishers are often arrested by the government of neighboring countries for alleged violations of exploration boundaries (Wuryandari, 2014). The fishers follow the ancient boundaries of the exploration area that have been guaranteed by international maritime law. The problem lies in the difference in perception.

The traditional marine worker business cycle still follows the conventional pattern (Figure 1). Capital is obtained from loans paid after the catch is obtained (Lubis et al., 2012). As shown in Figure 1, fishers who go to sea take loans from mediators to finance all their fishing needs, including fuel (diesel), or borrow diesel costs from diesel retailers. All fishing products are handed over to mediators, where fishers are only given money worth 50% of the results. The rest is given after the middleman sells the catch minus the initial loan value. Diesel loans will also reduce the remaining sales if the fishers separately use diesel loans. In the past, this system was very detrimental to fishers because fishers did not understand or control the selling price of fish. If the price of fish does not cover the loan amount, or the remaining fishing results are less than the capital to go back to sea, fishers will have to borrow again if they go to sea next time. It creates an endless cycle of lending capital. Currently, the condition is improving; fishers understand the selling value of fish. However, the adequacy of income is still not sufficient to increase power. At least fishers can still estimate the capital needed.

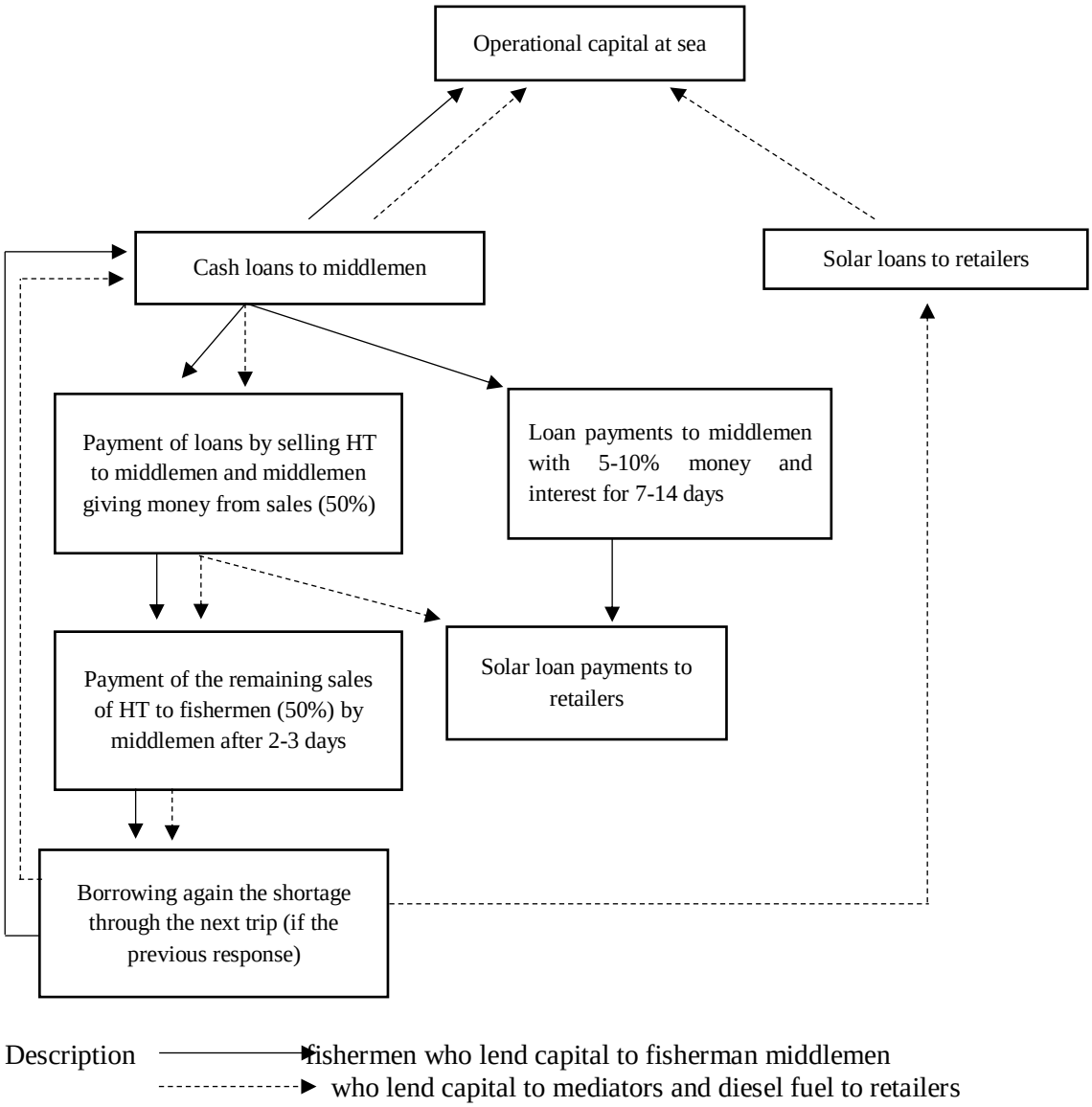

Figure 1. Sea capital circle (Lubis et al., 2012)

On the other hand, Muncar fishers go to sea with slerek boats in pairs of 2 ships, the husband's boat and the wife's boat (BMKG, 2016). The husband's ship is responsible for hunting fish and determining the nets' location to be spread. The ship's wife is responsible for the availability of accommodation. The Landlord owns these ships, while the one in charge of operations at sea is called the Marine skipper. The cost of procuring slerek vessels ranges from 750 million to 1 billion, with a minimum operational cost of around 7 million rupiahs for diesel fuel and ice blocks only. Financing is the responsibility of the Landlord. It is the basis for the 50:50 profit sharing between the skipper and the worker (Jiwandari, 2013). From 50% of the results for the workers, each individual involved earns varying wages. It is according to the workload and their respective roles. This profit-sharing system still varies in different skipper circles. This business system in Muncar provides better income potential when compared to the loan capital system of a fuel middleman/retailer.

Figure 2. The fleet of Slerek ships and their husband's ships (Finahari et al., 2021)

The catch of Muncar fishers is the largest in East Java and second in Indonesia after Bagan Siapi-api. The total catch in 2015 was 85 thousand tons. These results on paper guarantee the level of welfare of the fishing community. However, a preliminary study by Finahari et al. (2021) identified several crucial problems in the Muncar marine worker environment, including:

a. Inadequate work safety and health insurance
b. Individual wages are not enough
c. Operational costs, mainly fuel prices, are deemed too expensive
d. The selling price fluctuates according to the season and climate
e. Insufficient processing of catch fish

The problem becomes a climax during the harvest season, where fish are quickly sold to anticipate rot and not sell.

Technological aspects in fishing activities are also stated to affect the welfare of fishermen (Hendra, 2019). Various types of innovative technologies have been and are being developed. It includes internet-based technology, software, and hardware (Subandriyo, 2021). There have been innovations in measuring marine dynamics variables, exploration facilities, positioning, and aquaculture applications and equipment. Fajarrullah (2012) develop a mobile monitoring system that allows the Fisheries Service to monitor the number of catches per fishers per day. It helps monitor fish availability.

Since 2018 an android-based application has been introduced called Laut Nusantara (Saepuloh, 2021). This application is helpful for better planning fishing activities, starting to independently determine the nearest fishing location, estimating fuel requirements, and estimating selling prices while considering weather and wave conditions when working at sea. Estimated sources are satellite data, observation, and modeling data, provided in *real-time*. However, this application has only been downloaded by around 52 thousand people so far. However, it has been socialized in 28 regions of Indonesia. It is similar to a fishing technology called JukuTech (Figure 3), developed by Sahabat Pulau, a non-profit organization operating in Indonesia in social-entrepreneurship-based empowerment for coastal women and sustainable empowerment (Jamaludin, 2016).

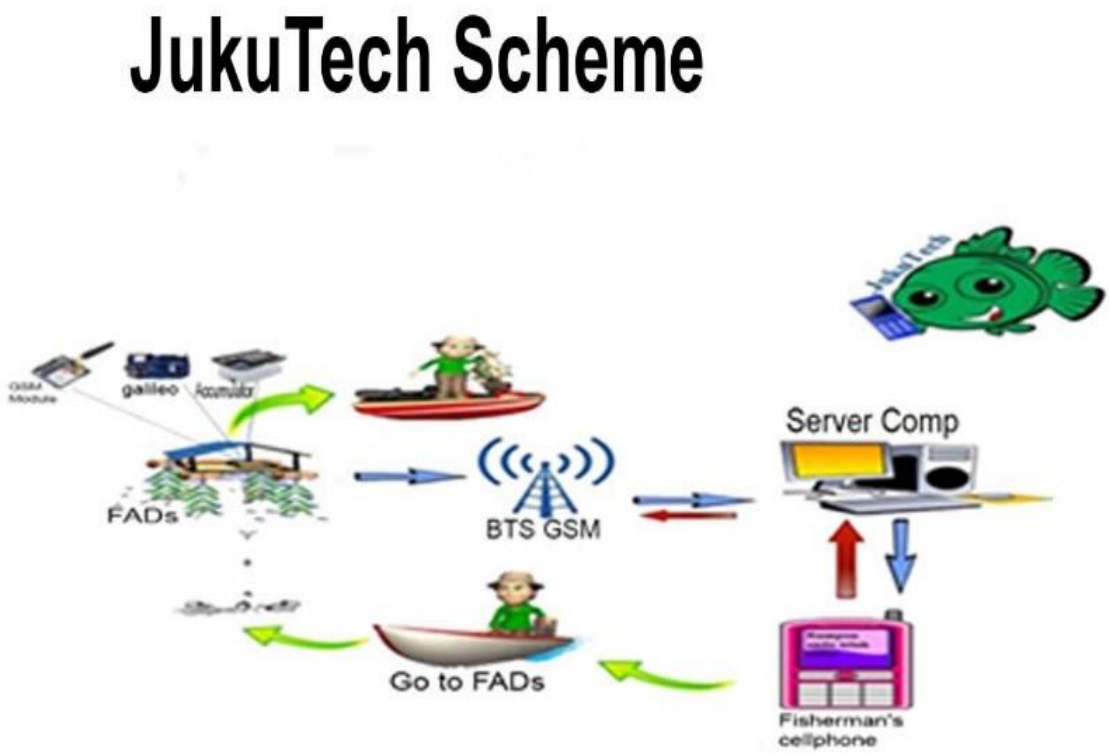

Figure 3. JukuTech Schematic ©2016 Merdeka.com

The Muncar fisherman business system can be a patron for the empowerment of fishing communities, although there are still some crucial problems. These problems need to be mapped in detail, seeking alternative solutions. This article aims to develop a hypothesis of a technology-based business system for marine workers that is more empowering, concerning the Muncar fisherman business system, along with the actions that need to be taken to test and verify this hypothesis.

METHODS

The analysis is based on data from surveys and interviews conducted in the preliminary study of (Finahari et al., 2021). The object of observation and interview respondents is Muncar fishers, where the observation and data collection process occurs in the second week of October 2021.

The data analysis is combined with a study of the latest research results on these problems so that a hypothesis can be drawn up. The hypothesis is then used to design further actions needed to test and verify it. The final result of this study is a recommendation for further research.

RESULTS

Referring to the literature review above, it is suspected that the solution to the problems of fishing communities is still relatively partial. The conceptual framework related to the issues of fishers can be summarized as shown in Figure 4. The figure also

shows a conceptual framework that can be prepared for planning exploratory actions to get the right solution. The conceptual framework offers five main problems of the poverty circle of fishing communities, but the general answer is still in the form of assistance which revolves around the capital. This temporary solution includes KUD, BUMD, and other financial institutions. But that doesn't solve 50% of the problem. When combined with illegal fishing, the pain is even more severe. The Slerek system and technological innovation can be combined with the current solution model to get an innovative business system.

From this conceptual framework, one hypothesis can be drawn up. The hypothesis raised is a multivariable cohesive-based hypothesis and is stated as follows:

The Muncar fishing business system in paired Slerek boats can be developed into a standard business system for marine workers in general, with several multivariable modifications and technology-based innovations.

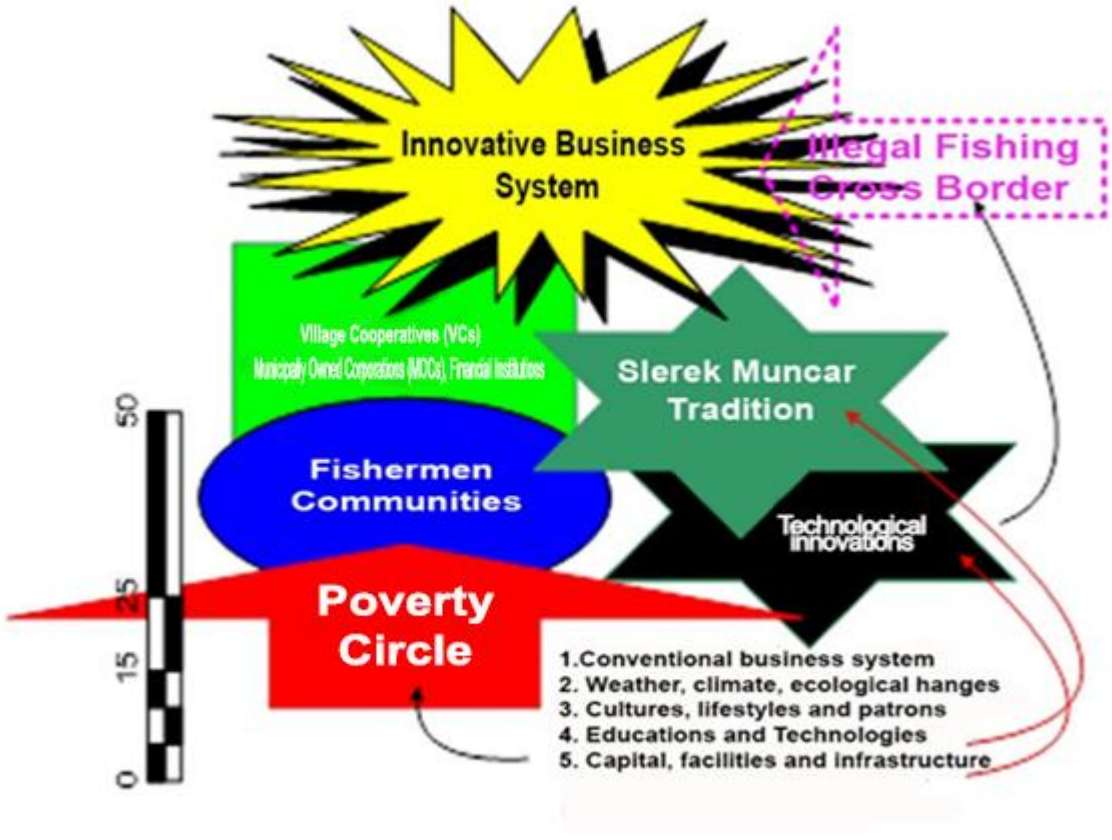

Figure 4. Conceptual framework

From the surveys and interviews conducted by Finahari et al. [9] and the conceptual framework in Figure 4, at least 2 (two) stages of further research can be constructed to test and verify the hypotheses have been prepared. These stages are:

1. The mapping stage details the type, scope, and current condition of marine worker problems in Muncar and Sendang Biru (or other fish ports). The final target is a big picture of marine worker problems that can be mapped in a structured way. This big picture will be used as a reference to create a conceptual design and a solution business system model. To achieve this target, the following activities need to be carried out:

a) Data collection and mapping of all marine worker business system variables.
The study area for this activity should be selected from Muncar Banyuwangi Harbor, compared to conditions at Sendang Biru Port (according to the object of the preliminary study) or other fish ports in various regions in Indonesia. This activity can be carried out on a large scale or a small scale according to available resources. This activity can be conducted by observation, interviews, FGDs with experts and actors, and opinion polls. The research will thus be better if it is carried out offline, field studies. It is to model the existing business parameters and constraints, and problems**.** While the initial model obtained should be verified by multidisciplinary experts and actors. The theoretically identifiable parameters should cover the following aspects: Socio-Culture, Capital Economics, Ecology and OHS, Law, and Technology.
b) Explore knowledge and readiness for technological innovation.
This activity can be done by using observation methods and distributing questionnaires about the level of understanding of marine workers about the types and varieties of marine technology that intersect with their work system. Technology dissemination can also measure the readiness for applying innovation to traditional and advanced fleets, along with the obstacles and challenges. An appropriate measure of the willingness of fishing communities to transfer technology is an essential key for changing the marine worker business system. It is related to technological developments that have entered Society 5.0, considering the real threat from illegal fishing fishers.

2. The design stage develops a solution concept and business system model integrated with the latest technological innovations. This conceptual design and business system model is the embryo of a solution for the Indonesian fishing community's global problem map, covering various fields. The conceptual design and model must be applicable in every region in Indonesia. This stage can be done with the following activities:
   a) The conceptual design of a solution business model is carried out by making expert incubation by the research team on existing business parameters and their problems that have been obtained from the first stage. The design results should be verified in a multidisciplinary FGD (Focus Group Discussion). It needs to be done to get the integral perception of the various fields of science involved in the marine worker business. FGDs can also guarantee the emergence of critical corrections from experts for matters involved. To conclude, FGDs need to be conducted several times. The designs and tested models need to be revised before being used as material for the next FGD. Once again, this is still influenced by the size and availability of available resources.
   b) Technological innovation can be strengthened through socialization, training, and assistance in mastering applicable technology by the target community. The technology applied in the innovative business system follows the character of the target targets, which have been mapped in the previous stage. This strengthening stage will be effective and efficient if the target community can have technology transfer equipment. Thus, this stage can also be at the same time a stage of increasing the level of potential mastery of technology. A method can be developed to help the target community master the technology, either through direct assistance, connecting with related parties, or sending a recommendation to the government to be taken over and followed up.

The positive results of the activities mentioned above still require analysis and evaluation after being piloted. Testing the system design and model is a mandatory due diligence step. The trial period is adjusted to the readiness of the targets. The minimum period is two fishing seasons which are usually interrupted by climate change. The innovative targeted system must overcome all obstacles in the fishing season and outside the fishing season. It means that the inventive system must have good sustainability and reliability. In the end, the partial output of the activity can be in the form of (1) a business parameter innovation model and (2) an applicative technology innovation verification map, which is academic performance.

What should be noted is that the Slerek system applied by Muncar Banyuwangi fishers is a traditional fishing system practiced for decades. The Slerek system is a cultural heritage that contains local policies. Adopting a Slerek-based business system can work seamlessly for fishing communities with the same character or at least the same culture as the Muncar community. Applying the innovative business system in the Slerek system in different cultural areas requires comparative studies with local culture and local policies. However, considering that cultural diversity in Indonesia has always experienced dynamic intersections throughout history, similarities between cultural icons and/or local policies between regions can be expected to exist. It is a crucial point to say that a business system that can be universally applicable to all fishing communities in the territory of Indonesia is possible. This system will be more powerful when equipped with the latest technological devices that meet the demands of the Information Technology Society 5.0 era.

CONCLUSION

This theoretical study concludes that a business system based on culture and local policies can develop into a system that empowers and prospers. The similarities that arise from cultural intersections between areas in Indonesia allow the construction of an innovative business system for marine workers in particular, which is universally applicable based on technological developments in the Society 5.0 era. This article is also an effort to socialize the marine worker business system based on local policies.

If the further studies discussed can be carried out with good results, the resulting business system will also be a recommendation for the Muncar fishing community in developing the perfection of their business system, especially for the application of technological innovation.

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