JOURNAL OF MARITIME RESEARCH

Vol XXIII. No. I (2026) pp 222–232

ISSN: 1697-4840, www.jmr.unican.es

A Phinisi as a Cultural Tourism Vessel of Local Wisdom for the Connectivity Supporting in IKN and Eastern Indonesia Region

Andi Ainul Akhsan Fidruzal A.Nurn[1], Alamsyah[1,5,*], Suardi[1], Muhammad Uswah Pawara[1], Hijriah[2], Abdul Mujib Syadzali[2], Azhar Aras Mubarak[3], Faisal Mahmuddin[4]

ARTICLE INFO

Article history:
Received 30 Apr 2025;
in revised from 01 Aug 2025;
accepted 05 Sep 2025.

Keywords:
Phinisi, Tourism, Local wisdom, Culture, IKN.

ABSTRACT

The New Capital City (IKN) impacts the rate of development in all sectors in the Eastern Indonesia Region. The Eastern Indonesia Region (KIT) has many cultural heritage, and natural beauty. The concept of integrated maritime tourism between IKN and KIT will have a significant impact on the rate of development in this sector. Phinisi has become part of the cultural wealth and history of the glory of the Indonesian Maritime. It has existed since the 16th century. Used as a cargo mode but however, over time, its function has changed to a high-class cruise ship. The purpose of this project is to design Phinisi as a means of transportation to connect the maritime tourism potential in KIT and IKN and the surrounding buffer areas. Using the Parent Design Approach method to transform the Phinisi ship into an educational tourist vehicle. The main dimensions of the ship are LOA = 28.03 meters, B = 8.05 meters, H = 4.55 meters, and T = 2.65 meters. The Phinisi design has a maximum speed of 12 knots and a personnel requirement of 7 people. The Phinisi is expected to become an educational and attractive tourism center for both local and international communities.

1. Introduction.

The relocation of the National Capital (IKN) represents the equitable development of Eastern Indonesia as a smart, green, and beautiful city center. It has unique maritime tourism potential. By developing tourism based on local wisdom values, it can support the goal of relocating the national capital (Putra, 2024). The concept of integrated and interconnected maritime tourism between one region and another is carried out. The concept of "ethno-maritime tourism (Bolnick, 2003) between the IKN and the Eastern Region of Indonesia is inclusive and interconnected.

Overall, this concept has potential in the development of the IKN region and its surroundings. The noble inclusive cultural values such as these need to be staked through the development of the maritime-based ethno-tourism concept. In addition, it forms opportunities for the development of tourism with historical and cultural content (Disparbud, 2023). The current generation's interest in historical events is very minimal, due to the assumption that history is identical to events related to time, place, and the names of the perpetrators. The most important thing in history is the values in the event. More focused and systematic efforts are needed so that the younger generation is interested in and likes the nation's history (Herianto, 2017). Phinisi ships, as one of the symbols of Indonesia's maritime cultural heritage, have been used since the 16th century. Functioning as cargo ships, as luxury cruise ships, or as tourist ships, reflecting

[1]Department of Naval Architecture, Sustainable Development of Faculty, Kalimantan Institute of Technology, 76127 Balikpapan, East Kalimantan, Indonesia.

[2]Department of Civil Engineering, Sustainable Development of Faculty, Kalimantan Institute of Technology, 76127 Balikpapan, East Kalimantan, Indonesia.

[3]Department of Naval Architecture, Sembilanbelas November Kolaka University, Indonesia.

[4]Department of Marine Engineering, Faculty of Engineering, Hasanuddin University, Makassar, Indonesia.

[5]Center of Maritime Infrastructure Engineering, Kalimantan Institute of Technology, Balikpapan, Indonesia.

*Corresponding author: Alamsyah. E-mail Address: alamsyah@lecturer.itk.ac.id.

the skills and traditions of South Sulawesi sailing (Mosriula, 2019). It has been operating since the 1500s in Indonesia. Used by sailors from the Makassar, Bugis, and Mandar tribes. While currently, the Phinisi ship has been converted into a tourist ship with the concept of liveaboard tourism (Kemenparekraf, 2023). Next, he sailed to Vancouver, Canada, United States in 1986. Therefore, South Sulawesi was nicknamed Butta Panrita Lopi (Ali, 2022), which means the area of phinisi makers. Including traditional sea transportation of the South Sulawesi people, which has been famous for centuries and is found in the manuscript Lontara I Babad La Galigo around the 14th century AD (Pemprov Sulsel, 2019).

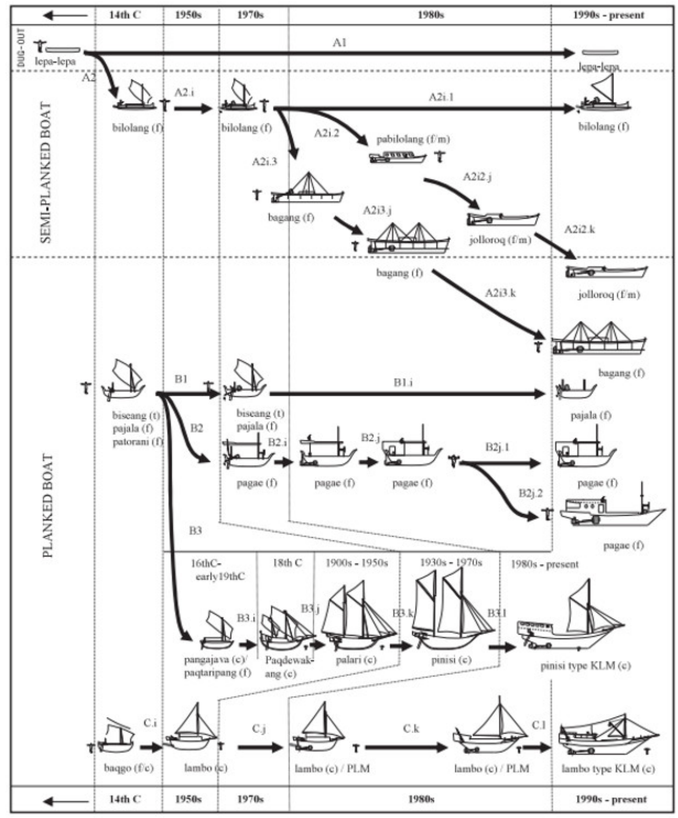
UNESCO has decided that the art of making Phinisi ships from South Sulawesi has been selected as an Intangible Cultural Heritage. Phinisi ships are recognized as being an invaluable part of the art of sailing in the archipelago. The series of processes for making Phinisi reflect social and cultural values. The Phinisi making technique pays attention to precision and navigational ability (Indonesiabaik.id, 2018). Phinisi is characterized by 7-8 sails and two main masts at the bow and stern of the ship. Traditional ships are made of ironwood, bitti wood, kandole/punaga wood, and teak wood. In Indonesia, production is centered in South Sulawesi, precisely in three villages, namely Tana Beru, Bira, and Ara Villages. This tourist ship is widely used for marine tourism in the Eastern Indonesia region (Fadillah et al., 2020).

Traditionally, Indonesian vessel are classified based on their rigging and sail type and have different names for their hull shape and type (Salam & Osozawa, 2008). Has a typical Indonesian tanjaq sail type. Its existence can be traced in several carvings on the walls of the 9th-century Borobudur temple. Other references to the existence of Tanjaq sails are found in Chinese, Arabic, and European cultures. This sail is typical of the' Islands Below the Win'd. A number of expeditions using Tanjaq sailboats have shown their reliability. One example is the voyage of the replica ship 'Borobudur' in 2003/2004, which followed the Indian Ocean trade route from Indonesia to Madagascar and Ghana, highlighting the capabilities of the Tanjaq sail. However, the use of this sail is currently limited to several small fishing vessels (Salam & Osozawa, 2008).

In terms of manufacturing techniques, traditional ships in Indonesia can be divided into two large groups, namely, Lesung ships, made by carving the inside of the wood to form a boat. On the other hand, the technique of making Papan ships is much more complex and complicated. The ship does not only use one piece of wood carved on the inside but uses various pieces of wood assembled into one unit. This results in a more diverse variety of types and shapes of ships and allows the manufacture of ships with larger sizes, such as phinisi ships (Putra, 2024).

Phinisi ships are grouped into two types of hull shapes: first, Palari, which is an early variant of the Phinisi ship. Its distinctive feature is a wider keel and a rudder located on the side used in fishing activities. Second, Lamba, or Lambo, is a modern form of the Phinisi ship that is still commonly used today, usually equipped with a diesel motor. Starting to become popular since the 1990s, this hull shape was inspired by the design of European ships. With the rudder placed in the middle, this

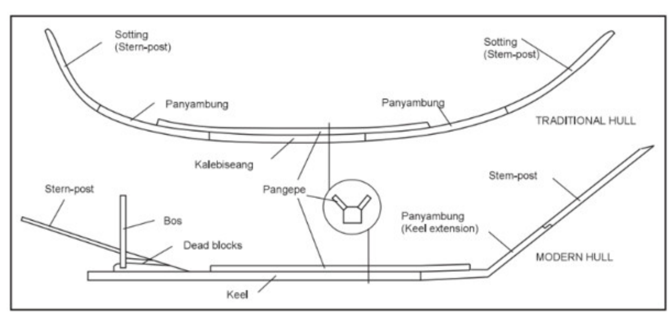
Figure 1: Boat Evolution on South Sulawei Indonesian.



Source: Salam & Osozawa, 2008.

shape is more suitable for engine use and makes it easier to maneuver the ship (Salam & Osozawa, 2008).

Figure 2: Hull form of Palari (top), Lambo (down).



Source: Salam & Katsuya, 2008.

Phinisi ships are not only a symbol of craftsmanship and beauty in traditional shipbuilding but also represent the identity and pride of the Indonesian nation. Recognition from UNESCO as an Intangible Cultural Heritage shows how valuable the phinisi ship is as part of the world's cultural heritage (Suparman et al., 2022). Phinisi ships can also be developed into objects of art (Ulfa et al., 2022). Phinisi is a symbol and emblem of extraordinary technical progress and is still based on high artistic values and traditional and symbolic culture (Rahmi et al., 2024). Traditional ceremonies are needed that are based on the belief in a power in constructing it (Prinyandhitya, 2005).

The Phinisi ship is a cultural representation that has local wisdom values that must be preserved and instilled in the young generation of South Sulawesi (Ridwan & Sutiyono, 2020). The South Sulawesi community has a tradition of making traditional phinisi ships that are full of local wisdom values but are starting to be forgotten by the current young generation. One of the factors is the entry of globalization, according to (Berry, 2008; Zarzar & Guney, 2008). The process of globalization causes cultural homogeneity. Throughout the world, local culture is suppressed by the development of modern culture, resulting in the loss of cultural diversity (Sartini, 2004; Bhawuk, 2008).

The values of local wisdom and religion are found on the ship's sails, which consist of 7 sails symbolizing 7 verses from the Al-Fatihah surah. With this symbol, it is used as a philosophy of life, as a prayer for safety when sailing at sea, and as social values. Seeing the current conditions, the younger generation is quicker to grasp visual lessons (Qodariah & Armiyati, 2013). The existence of Phinisi in society provides religious, social, and economic functions (Amar & Sulastri, 2020). Phinisi has a very meaningful philosophy. These values include the values of cooperation, hard work, precision, beauty, and religion (Lisbijanto, 2013). Phinisi is not merely a work of human civilization but has the value of a cultural heritage of religious ancestors and is rich in sources of cultural knowledge (Hasniar & Parera, 2020).

The values of cooperation and hard work are reflected in the relationship between the punggawa (chief craftsman or skilled craftsman) and the sawi (other craftsmen). Starting from the felling of the tree, which is the main material, until the end of the launching of the phinisi (Akhmad et al., 2020). The phinisi ship also has strong cultural values in the local community. In traditional events and religious ceremonies, the phinisi ship is also a symbol of spirituality and community belief. This ship is decorated with typical ornaments that have religious meaning and symbolize the relationship between humans and nature and God (Paraga Batara Putra, 2020).

During the shipbuilding process, certain rituals are also performed, and prayers are also said for the safety of the ship and its crew. These rituals have spiritual meaning and are an important part of the Phinisi shipbuilding process (Angelita et al., 2024). The form and meaning of the Phinisi shipbuilding ritual reflect the local wisdom possessed by the local community. The shipbuilding process is carried out in stages and regularly by paying attention to the rules that have been set by their ancestors (Sukardi & Busri, 2024). Each ornament has a symbolic meaning related to the beliefs and culture of the Bulukumba community (Priyandhitya, 2005). In the context of the Phinisi ship, the image of a bird also depicts the freedom of sailors in exploring the vast ocean (Rulia & Kurniawan, 2022). Thus, the Phinisi shipbuilding ritual is a tradition that is rich in cultural values and has an important role in maintaining the identity of the local community (Rahmi et al., 2024).

On the other hand, a phinisi is a traditional Indonesian ship built using skills passed down from generation to generation; shipbuilders ignore engineering and safety considerations (Setiawan et al., 2023). Shipbuilders in East Kalimantan have made several changes to the ship's design in the main dimensions, resulting in changes in ship characteristics such as ship speed and stability (Alamsyah et al., 2021a). The main material for making it is wood. The availability of wood material is one of the variables that affects the price of building a ship. Requires craftsmen to be careful and efficient in the use of wood. Phinisi wood efficiency can be maximized at large gross tonnage sizes (Alamsyah et al., 2021b). Ship damage often occurs due to the selection of types, sizes, and ages of wood that do not meet the criteria. Many identified ship constructions fail to meet the requirements that have implications for the safety and security of the crew, ship, and cargo during operation (Pawara et al., 2023).

Technical studies related to the performance and modification of Phinisi ships have been widely conducted (Asis et al., 2023; Asis et al., 2020; Dianiswara et al., 2020). Likewise related to safety evaluation during sailing (Paroka et al., 2022; Paroka et al., 2021). The development of new methods in performance analysis is also applied (Mahmuddin et al., 2016). Tourist ships with the Phinisi ship concept for the Eastern Indonesia region are designed to increase the tourist attraction in the region. Ships designed with wooden materials have been recognized by UNESCO as one of the world's cultural heritages (Suardi et al., 2023).

This study focuses on the Eastern Indonesia region, especially the IKN and the surrounding buffer areas, including South Sulawesi. It has many tourist attractions that can be connected to each other with Phinisi. There is great potential in the maritime tourism industry that supports public understanding of the history of Phinisi. To support this shipping route, transportation is very much needed, and one type of ship that remains the center of attention for tourists is the Phinisi ship (Kemenparekraf, 2023). This study aims to design a Phinisi ship that functions as transportation and a floating museum. The design of the Phinisi ship, which is full of local wisdom entities of Indonesian maritime culture, becomes an integrated marine tourism unit (Pusdatin Kemenparekraf, 2022). The design method uses a parentship approach in determining ship dimensions, line plans, and general arrangements, followed by analysis of obstacles and stability.

2. Research Methods.

2.1. Collecting data and Information.

In the initial stage, relevant data and information were collected from various sources, including books, articles, websites, journals, and other scientific works related to Phinisi ships. The data collected includes information on tourism potential, the historical context of Phinisi ships, and existing Phinisi ship designs. This information serves as a basis for understanding the requirements and context of the ship design to be developed.

2.2. Collecting data and Information.

1. Parent Design Approach Method.

The main dimensions of the Phinisi tourist boat were determined using the Master Design Approach, utilizing data from existing boats for comparison (Parson, 2009; Papanikolaou, 20-14). The selected reference boat, "Labuhan Timur 7," provided a strong basis for determining the main dimensions of the designed Phinisi (Khaqiqi & Dwianto, 2020). The main dimensions of the comparison boat are as follows: Overall Length (Loa) = 37.14 meters, Width (B) = 8.05 meters, Height (H) = 4.55 meters, and Speed (Vs) = 12 knots. The basis for selecting the comparison boat is because it is considered to have been operating and has good performance (Alamsyah et al., 2021a; Suardi et al., 2022). At this stage, the output of the main dimensions and hull shape coefficient of Phinisi is produced.

2. Lines Plan (Drawing).

The drawing of the line plan as the basic pattern of the Phinisi shape is carried out. The assistance of B-spline-based software is used (Alamsyah & Nugroho, 2018). The output of this stage provides images of the body plane, water plane, and buttock line. The displacement of the Phinisi design is also determined.

2.3. *Initial of Calculation.*

Initial calculations were performed to validate the main dimensions and ensure the ship design meets operational requirements. These calculations included Froude numbers and various coefficients to assess the ship's hydrodynamic performance. The results confirmed the feasibility of the dimensions and provided a basis for further analysis.

$$F_n = \frac{V_s}{\sqrt{g \times L}} \tag{1}$$

where:
F_n = Froud Number.
V_s = Service of Velocity.
g = Accelerated by gravity.
L = Length of Phinisi.

2.4. *Gross Tonnage and Net Tonnage Calculations.*

Gross Tonnage (GT) and Net Tonnage (NT) are calculated to determine the overall volume of the ship and the usable space for cargo and passengers. These values are important for regulatory compliance and operational efficiency. The calculated GT and NT values ensure that the ship can accommodate the intended number of passengers and crew while maintaining safety and stability (Kemenhub RI, 2021).

$$GT = 0.25 \times v \tag{2}$$

$$NT = 0.30 \times GT \tag{3}$$

where:
GT = Gross tonnage.
v = volume.
NT = Netto Tonnage.

2.5. *Powering of Calculations.*

Based on the resistance calculation using the Van Oortmersen method supported by B-spline software, the power requirement for the main engine is determined. The selected engine specifications ensure that the ship can reach and maintain the desired speed while operating efficiently. The analysis confirms that the engine selection will meet operational requirements without overloading the ship's structure.

$$BHP = DHP \times (1 + 0.003) \tag{4}$$

$$DHP = \frac{EHP_s}{PC + g} \tag{5}$$

$$EHP_s = rl + EHP_{tr} \tag{6}$$

$$EHP_{tr} = R_T \times V_s \tag{7}$$

$$EHP_{tr} = R_T \times V_s \tag{8}$$

$$R_T = R_R + R_F \tag{9}$$

where:
BHP = Brake Horse Power.
DHP = Deliveri Horse Power.
EHPs = Effective Horse Power of service.
EHPtr = Effective Horse Power of thrust.
PC = Effeciency of total.
rl = 1+40%.
R_T = Resistance of total.
R_R= Residual of Resistance.
R_F= Frictional of Resistance.

2.6. *Weight of Calculations and Displacement Correction.*

The weight of a ship is calculated by dividing it into two main components: light weight (LWT) and deadweight (DWT). LWT includes the weight of the ship's structure, machinery, and fixed equipment. DWT includes the cargo carried during the voyage, such as fuel, lubricants, crew equipment, fresh water, and passenger cargo. Weight calculations are performed, and displacement corrections are also made to ensure the accuracy and reliability of the design and to ensure the depth of the hull immersed under water is in accordance with the design draft size.

$$\Delta 1 = L \times B \times T \times C_B \times 1.025 \tag{10}$$

$$\Delta 2 = LWT + DWT \tag{11}$$

$$\Delta 1 \geq \Delta 2 \tag{12}$$

where:
Δ1 = Displacement of Phinisi Design
L = Length of Phinisi
T = Draft of Design

CB = Coefficient of Block
Δ2 = Displacement of Phinisi weigth
LWT = Light weigth ton
DWT = Dead weigth ton

2.7. *Analysis of Ship Stability.*

Ship stability analysis is carried out based on standards set by the International Maritime Organization (IMO, 2008). This analysis includes calculating the center of gravity (G), buoyancy (B), and metacentric height (M). Ship stability testing is carried out under various loading conditions to ensure that the ship has sufficient stability to withstand external forces such as wind and waves. The results of the stability analysis are used to assess the safety and comfort of the ship during operation (Alamsyah et al., 2024).

3. Result.

3.1. *Types Constrain of Main Dimension and Hull Form Coefficient.*

The main dimensions of Phinisi that have been determined through a comparison vessel (Parentship Approach). Furthermore, it is validated using constraints according to Van Oortmerssen, as shown in Tables 1 and 2 below.

Table 1: Main Dimension of Phinisi Design.

Main Dimension	*value*	*units*
LOA	28.03	*meters*
B	8.05	*meters*
H	4.55	*meters*
T	1.6	*meters*
Vs	12	*Knots*
Crew	18	*people*

Source: Authors.

where:
LOA = Length Over All of Phinisi.
B = Breadth of Phinisi.
H = Heigth of Phinisi.
Vs = Velocity.
Crew = Crew of Phinisi.

Table 2: Constrain of Main Dimension of Phinisi Design.

Requirement					*Phinisi of Data*
8 *m*	≤	*L*	≤	80 *m*	28.03 *m*
3	≤	*L/B*	≤	6.2	3.4
0.5	≤	*Cp*	≤	0.73	0.69
-8%	≤	*LCG/L*	≤	2.8%	-5.4 %
5 m^3	≤	*v*	≤	3000 m^3	344.432 m^3
1.9	≤	*B/T*	≤	4.0	3.01
0.70	≤	*Cm*	≤	0.97	0.96
10	≤	*iE*	≤	46	38

Source: Authors.

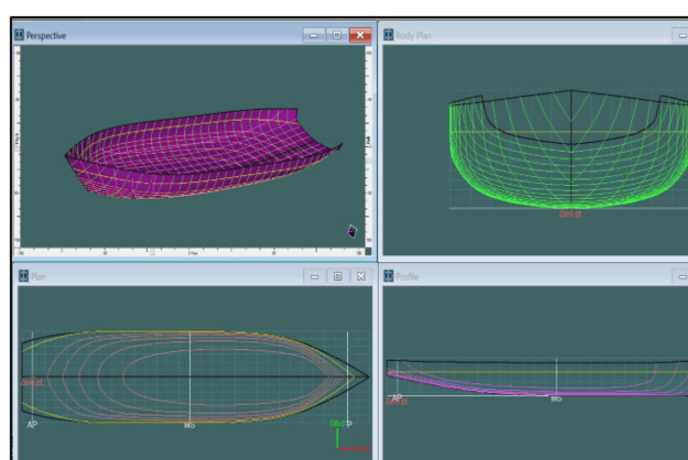
where:
L = Length of Phinisi.
T = Draft of Design.
B = Breadth of Design.
Cp = Prismatic coefficient.
LCG = Longitudinal Centre of Gravity.
v = volume.
Cm = Midship coefficient.
iE = Half angle of entrance.

3.2. *Set-up of General Arragement of Phinisi Design.*

The creation of the Phinisi General Arrangement (GA) design includes a lines plan, room and compartment layout above and below the main deck, engine power requirements, weight calculations, and initial stability. Some of the outputs used in the Phinisi GA are the results of calculations from the equations in the research method section listed previously. Some of the outputs are shown in the following figures and tables.

Figure 3:

Figure 3: Lines Plan of Phinisi.



Source: Authors.

Source: Authors.

Table 3.

Table 3: GA Component of Phinisi Design.

Initial GA	Number of Equation	value	units
Fn	1	0.3583	-
GT	2	247	
NT	3	74	
Δ1	9	353	tons
Δ2	10	348.56	tons
DWT	10	23.032	tons
LWT	10	325.528	tons
CB	9	0.55	
BHP	4	1990	HP
R_T	8	79.024	kN

Source: Authors.

3.3. Breakdown of LWT and DWT of Component.

DWT components include payload, consumables, and crew. Consumables consist of fuel oil, lubrication oil, fresh water, and provisions. LWT includes the weight of the ship's structure that forms the ship's hull, equipment, supplies, and machinery.

Table 4: GA Component of Phinisi Design.

DWT of Component	Weigth (tons)	VCG (meters)	LCG (meters)
Fuel oil	6.680	0.35	10.547
Lubricant oil	3.527	0.357	-0.617
Fresh water	9.086	7.744	-7.355
Passenger and provision	2.2	7.744	-7.335
Crew and provision	1.54	1.971	-6.696
LWT of Component	Weigth (tons)	VCG (meters)	LCG (meters)
Structural	325.528	1.8	-1.5
outfitting	2.815	2.1	6.75
Machinery system	6.95	0.9	-7.5

Source: Authors.

where:

VCG = Vertical Centre of Gravity measurement from buse-line.

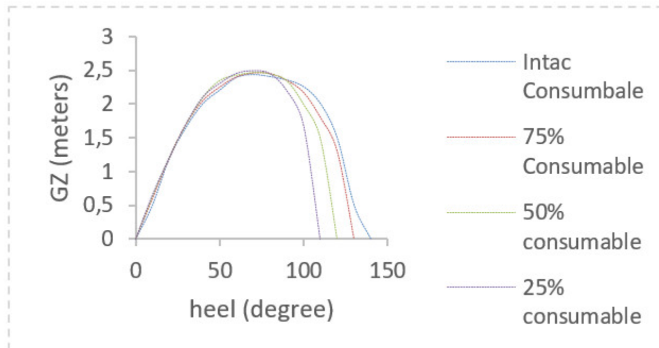
LCG = Longitudinal Centre of Gravity measurement from Midship.

Table 3 shows the weight components of the Phinisi in tons divided into two large components. The center of gravity of each component vertically (VCG) is identified. Likewise, longitudinally determined (LCG). So that the accumulative center of gravity of the Phinisi components is obtained. For the total VCG value = 1.93 meters and the total LCG value = -1.52 meters. These data are the basis for calculating the stability of the Phinisi.

3.4. Loadcase Operational of Phinisi.

Operational load case Phinisi is made into four scenarios. Starting when Phinisi will depart from the port of origin (100% consumable), during the middle of the voyage (75% and 50% consumable), and the scenario of arriving at the destination port (25% consumable). The difference between each operational load case is the consumable value. This difference changes the center of gravity of the phinisi, which has implications for the stability conditions during the voyage. The stability criteria used are the stability criteria for general-type ships, referring to IMO A.749(18) Chapter 3.

Figure 4: Righting arm curve of Phinisi.



Source: Authors.

Figure 4 shows the Phinisi stability arm curve. The blue line shows the intact consumable scenario. It has a stability range at a slope of 0-140 degrees. The red line represents the consumable scenario of 75% of the intact condition and has a stability range of 0-130 degrees. The green line shows the consumable scenario reduced by 50% and has a stability range of 0-120 degrees. While the purple line shows 25% consumable and has a stability range of 0-110 degrees. The Phinisi stability check for all Canary load loadcases based on IMO can be seen in the following table.

Table 5: IMO standart vs actual.

Criteria IMO	units	Loadcase Intac	Loadcase 75%	Loadcase 50%	Loadcase 25%
$A\theta_{(0\text{-}30)} \geq 3.151$	m.deg	26.07	26.38	26.49	26.70
$A\theta_{(0\text{-}40)} \geq 5.156$	m.deg	44.49	45.17	45.40	45.84
$A\theta_{(30\text{-}40)} \geq 1.178$	m.deg	18.42	18.79	18.91	19.14
$GZ\theta_{30} \geq 0.2$	m	2.43	2.46	2.47	2.49
$\theta GZ_{max} \geq 15^o$	deg	71.8	70.9	70.9	70.9
$GM \geq 0.35$	m	3.29	3.28	3.28	3.28
Range of $Stability_{(0\text{-}70)}$	deg	140	130	120	110

Source: Authors.

where:

$A\theta_{(0-30)}$ = Area under righting arm curve of 0-30 heel.

$A\theta_{(0-40)}$ = Area under righting arm curve of 0-40 heel.

$A\theta_{(30-40)}$ = Area under righting arm curve of 30-40 heel.

$GZ\theta_{30} \geq 0.2$ = GZ value at 30 heel above or equal 0.2 meters.

$\theta GZ_{max} \geq 15^{o}$ = GZ max. value above or equal 15 degree.

$GM \geq 0.35$ = GM initial value above or equal 0.35 meters.

Range of $\text{Stability}_{(0-70)}$ = GZ value have positif minimum of 70 heel.

m = meters.

deg = degree.

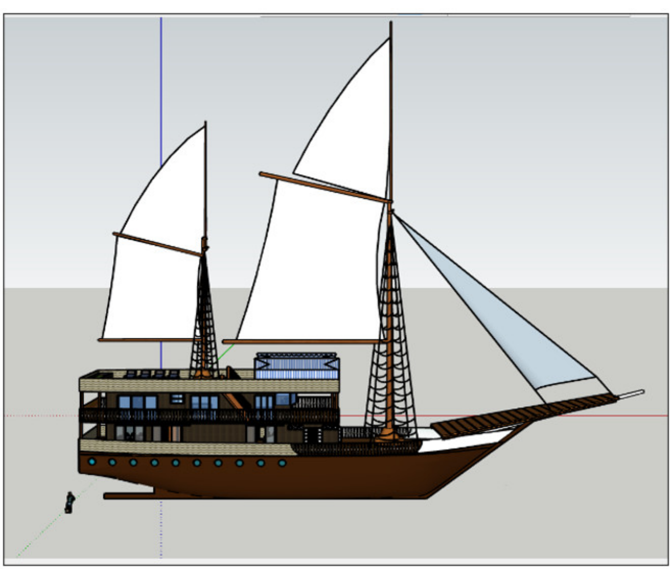
m.deg = meters.degree.

Table 5 shows a comparison of IMO criteria and simulation results of Phinisi operation scenarios. All scenarios are still within the range of IMO criteria so that Phinisi is detected as safe during operation.

3.5. 3D Design of Phinisi.

The creation of 3D Phinisi is based on the line plan and GA designed based on calculation data. Includes the planning of the required space according to its function and equipment. Examples of such spaces include cargo space, accommodation space, engine rooms, tanks, and others. The placement of the main rooms and their boundaries to the hull and superstructure are determined.

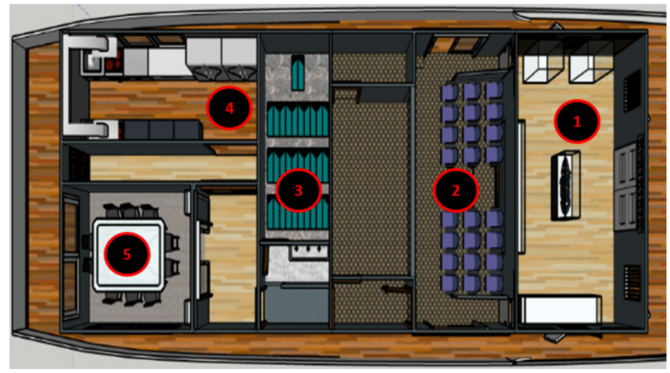
Figure 5: 3D of Phinisi.



Source: Authors.

Figure 5 shows the full 3D of Phinisi. Modeling of all compartments on each deck level was done. Developed to optimize space utilization and ensure functionality for passengers and crew. Includes detailed layouts for the main deck, accommodation areas, and critical operational spaces. This design ensures that all areas are easily accessible and the ship meets ergonomic and safety standards. Shown in Figure 5-10 below.

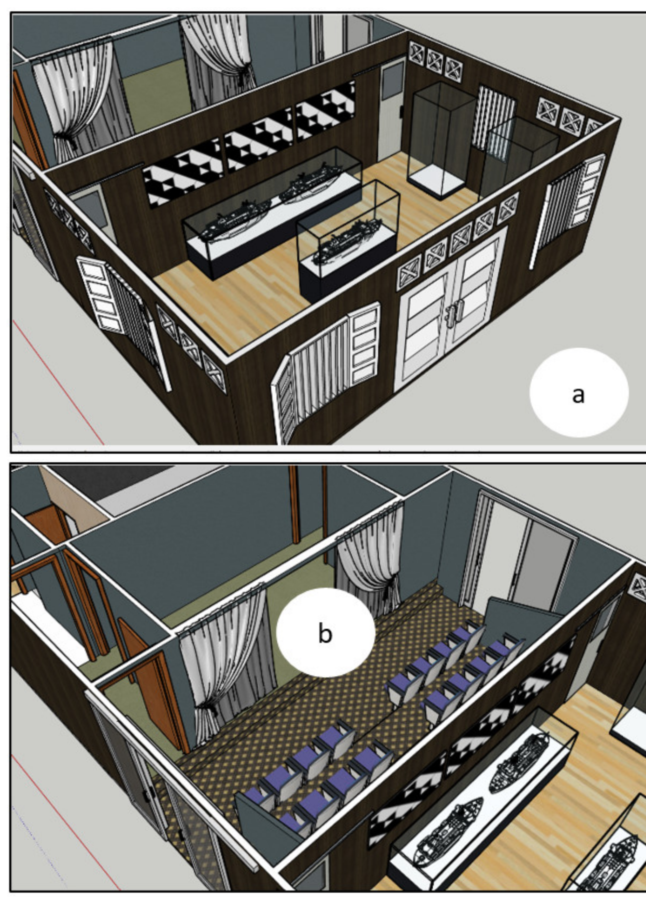
Figure 6: 2D Main deck plan of Phinisi.



Source: Authors.

where:
1 = Museum space.
2 = theater space.
3 = pray room.
4 = messroom.
5 = galley.

Figure 7: 3D of museum and theater space.



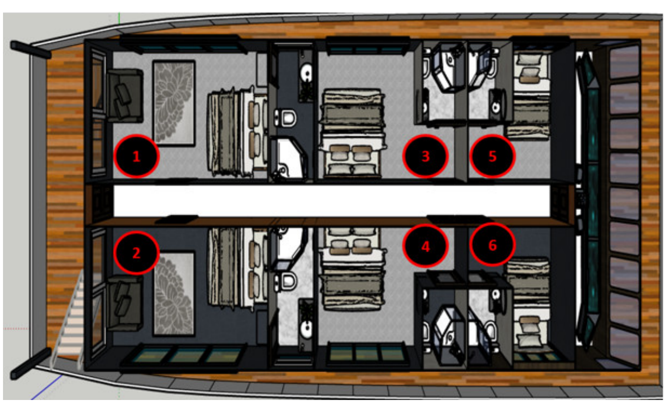
Source: Authors.

where:
a = 3D Museum space

b = 3D theater space

Figure 7a shows that the Museum on the Pinisi ship adopts the characteristics of the Balla Lompoa Museum by using wooden elements such as walls, windows, doors, and ventilation as references. Each design element is carefully selected to create an authentic and attractive atmosphere, reflecting the rich culture and history of the area. By integrating these elements, the museum on the Pinisi ship not only functions as a place to display artifacts and historical information but also offers an impressive experience, giving visitors a deep understanding of Sulawesi culture. Meanwhile, Figure 7b shows the main function of the theater as an entertainment center for passengers, presenting various performances such as traditional dances, documentary screenings about the making of the Pinisi, art performances, musicalization of Sulawesi culture, and other entertainment events. With a comfortable and attractive atmosphere, this theater is an ideal place for passengers to enjoy various forms of entertainment and introduce the richness of Sulawesi culture to those who come from various parts of the world.

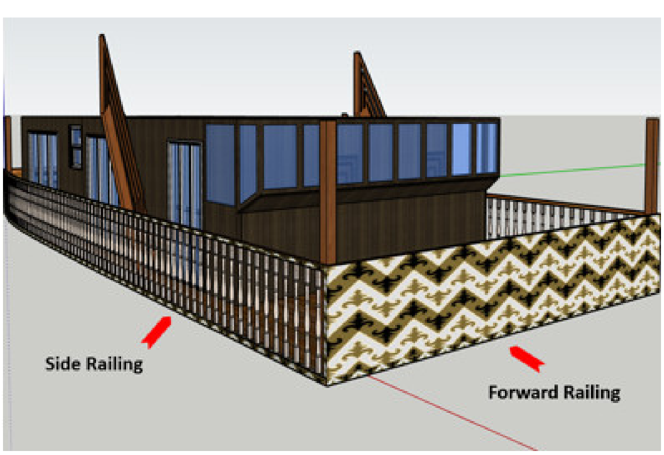
Figure 8: 2D the deck II plan of Phinisi.



Source: Authors.

Figure 8 shows the level II deck of Phinisi. Accommodates VVIP and VIP rooms for passengers. It consists of 2 large rooms, 2 medium-sized rooms, and 2 relatively small rooms.

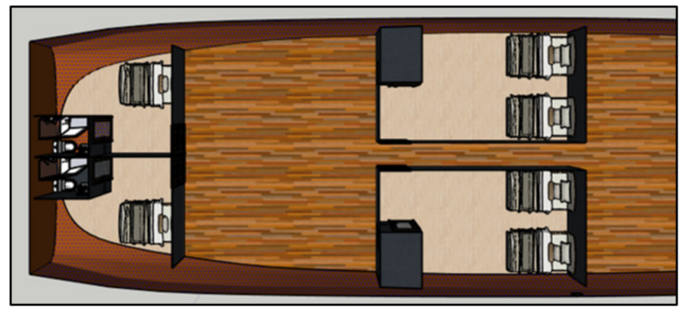
Figure 9: Railing plan deck level II of Phinisi.



Source: Authors.

For the left and right side railings, they were inspired by the carvings of wooden stair pillars at the Balla Lompoa Museum. The carvings were carefully measured and applied to the wood on the Pinisi railing, providing a unique aesthetic touch and rich cultural value. For the front and rear railings, they adopted traditional Toraja motifs. This makes the railing not only function as a handle but also display the beauty of Toraja carving art, which is full of cultural and aesthetic values.

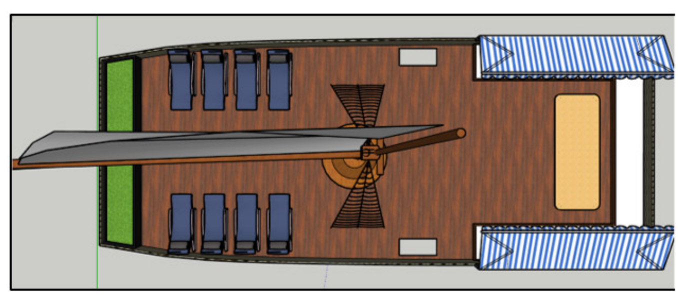
Figure 10: 2D the bottom plan of Phinisi.



Source: Authors.

Figure 10 shows the bottom floor of Phinisi, which consists of complete accommodation, including two rooms with comfortable single beds for single passengers, as well as two rooms with spacious double beds, ideal for crew. Each room is designed to ensure maximum comfort during the cruise.

Figure 11: 2D the bottom plan of Phinisi.



Source: Authors.

Figure 11 shows the top deck of Phinisi; there is a beautiful and refreshing garden. Around it, there are eight comfortable lounge chairs to enjoy the sea view. In addition, there is also a large gathering area, equipped with two folding canopies that can be used for shelter, creating a more comfortable and pleasant atmosphere for passengers.

Conslusions.

Based on the results of the study and planning starting from the concept to the technical aspects of Phinisi, it can be recommended that the Pinisi design operate in the eastern region of Indonesia, including the IKN. The Phinisi design is a mode of marine tourism transportation connecting the IKN, buffer areas, and the eastern region of Indonesia in realizing integrated marine tourism. The Phinisi design is themed ethno-tourism based on integrated maritime and adopts local cultural wisdom as a symbol of Indonesia's maritime glory in the past. It has the main dimensions of Loa = 28.03 m, B = 8.05 m, H = 4.55 m, T = 2.65 m, Vs = 12 knots, a crew of 7 people, and passengers = 10 people. It has good ship stability safety that sails in the waters of eastern Indonesia. Passengers can enjoy marine tourism. In addition, they can feel the traces related to the process of making Phinisi and the history of past maritime glory, which must remain the identity of the nation today.

Acknowledgements.

We would like to thank the Institute for Research and Community Service of the Kalimantan Institute of Technology for funding this research. Contract number 13310/IT10.L1/PPM.04/2025. We would also like to express our appreciation to the Center for Excellence in Maritime Technology Infrastructure Engineering team, who have provided space and significant contributions in the form of laboratories related to this research.

References.

1. Akhmad, A., Amir, A., Asdimuh, A. and Syukur, M., (2020). The Development Prospect of the Pinisi Vessel Industry in the Bulukumba Regency Indonesia. International Journal of Innovation, Creativity and Change, 12(10), pp.183-194.
2. Alamsyah, A., Setiawan, W., Cahya, E.D., Wulandari, A.I. and Alifantio, A., (2021a). Design of Fishing Vessel of Catamaran Type In Waterways of East Kalimantan (40 GT). In Journal of Physics: Conference Series (Vol. 1726, No. 1, p. 012014). IOP Publishing.
3. Alamsyah, A., Pawarah, M.U. and Dianiswara, A., (2021b). Kajian Kebutuhan Material Pada Konstruksi Lambung Kapal Phinisi. Jurnal Penelitian Enjiniring, 25(1), pp.77-84.
4. Alamsyah, Nugroho, M. D., (2018). Desain Kapal Katamaran Sebagai Moda Transportasi Perairan Sungai Mahakam Di Samarinda. Jurnal Wave Volume 12 Nomor, 1.
5. Alamsyah, A., Fikri, M., Suardi, S., Pawara, M.U., Ikhwani, R.J., Setiawan, W. and Paroka, D., (2024). Comparative Assestment of the Effect of Changing the Breadth (B) of the Ship on the Stability of the Tugboat. TransNav, International Journal on Marine Navigation and Safety od Sea Transportation, 18(4), pp.905-914
6. Ali, M.Y., (2022). The process of making a pinisi boat in bantobahari district, bulukumba regency, Indonesia. European Journal of Engineering and Technology Research, 7(5), pp.70-75.
7. Amar, S. and Sulastri, A., (2020), May. The Pinisi: A Study on the Development of Boat Technology. In Journal of Physics: Conference Series (Vol. 1539, No. 1, p. 012069). IOP Publishing.
8. Angelita, G., Saksono, E.H. and Septiana, W., (2024). Strategy to Build National Branding through the Power of StoryBrand (Introducing the Pinisi Ship and Indonesia Hospitality at the 2023 ASEAN Summit).
9. Asis, M.A., Anggriani, A.D.E. and Ramadhan, F.R., (2023). The Prediction of Hydrodynamic Performance of Pinisi Ship. Kapal: Jurnal Ilmu Pengetahuan dan Teknologi Kelautan, 20(2), pp.134-145.
10. Asis, M.A., Paroka, D., Asri, S. and Syam, M.A., (2020). Effect of Bilge Keels Position On Roll Motion Performance Of Traditional Wooden Boat. International Journal of Marine Engineering Innovation and Research, 5(3), pp.190-197.
11. Berry, J.W., (2008). Globalisation and acculturation. International journal of intercultural relations, 32(4), pp.328-336.
12. Bhawuk, D.P., (2008). Globalization and indigenous cultures: Homogenization or differentiation?. International journal of intercultural relations, 32(4), pp.305-317.
13. Bolnick, S., (2003). Promoting the culture sector through job creation and small enterprise development in SADC countries: the ethno-tourism industry (No. 993653413402676). International Labour Organization.
14. Dianiswara, A., Hasmi, A.N. and Alamsyah, L.P.A., (2020). Kajian Gerakan Roll Kapal Pinisi dengan Bilge Keel. Inovtek Polbeng, 10(2), pp.152-157.
15. Disparbud Selayar, (2023). Kunjungan Wisatawan ke Kabupaten Kepulauan Selayar tahun 2022 Meningkat Signifikan. Available from: https://pariwisata.kepulauanselayarkab.go.id/2023/01/kunjungan-wisatawan-ke-kabupaten-kepulauan-selayar-tahun-2022-meningkat-signifikan/ [Accesed 19 April 2024]
16. Fadillah, A.F., Ibrahim, B.K. and Manullang, S., (2020). Desain Kapal Wisata Jenis Pinisi di Perairan Indonesia Timur. Jurnal Manajemen Transportasi & Logistik (JMTRANSLOG), 7(1), pp.49-58.
17. Hasniar, H., & Parera, A. (2020). The Symbolic meaning of Pinisi Boat Building Ceremony in Ara Village District of Bontobahari Bulukumba Regency: A Semiotic Analysis. In Proceedings of the Third International Seminar on Recent Language, Literature, and Local Culture Studies, BASA, 20-21 September 2019, Surakarta, Central Java, Indonesia.
18. Herianto, R., (2017). Generasi Muda Tak Tertarik Sejarah. Available from: http://sribaduga.jabarprov.go.id/berita/post/generasi-muda-tak-tertarik-sejarah#:~:text=%22Ketertarikan%20generasi%20sekarang%20terhadap%20peristiwa,tempat%2C%20pelaku%2C%20dan%20waktu. [Accesed 19 April 2024]
19. IMO (2008). The International Code on Intact Stability (2008 IS CODE). International Maritime Organization, London.
20. Indonesiabaik.id, (2018). Kapal Pinisi Indonesia Masuk Warisan Budaya Dunia. Available from : https://www.indonesiabaik.id/infografis/kapal-pinisi-indonesia-masuk-warisan-budaya-dunia [Accesed 19 April 2024].

21. Kemenparekraf/Baparekraf RI, (2023). Kapal Pinisi, Kapal Wisata Warisan Nenek Moyang. Available from: https-://www.kemenparekraf.go.id/ragam-parekraf/kapal-pinisi-kapal-wisata-warisan-nenek-moyang [Accesed 19 April 2024]
22. Kementrian Perhubungan Republik Indonesia, (2021). Permenhub RI, 2021 NOMOR PM 45 TAHUN 2021 TENTANG PENGUKURAN KAPAL.
23. Khaqiqi, A.S. and Dwianto, A.H., (2020). Desain Kapal Tradisional Pinisi untuk Jaringan Tujuan Wisata Berkelanjutan: Studi Kasus Gugus Kepulauan Selayar. Jurnal Penelitian Transportasi Laut, 22(1), pp.47-56.
24. Lisbijanto, H., (2013). Ludruk. Yogyakarta: Graha Ilmu. Indonesia
25. Mahmuddin, F., Fitriadhy, A. and Dewa, S., (2016). Motions Analysis of a Phinisi Ship Hull with New Strip Method. International Journal Of Engineering And Science Applications, 2(1), pp.91-97.
26. Mosriula, M., (2019). Analysis of land suitability, carrying capacity, and development strategies for seaweed cultivation in Labakkang District, Pangkep Regency, Indonesia. Akuatikisle: Jurnal Akuakultur, Pesisir dan Pulau-Pulau Kecil, 3(2), pp.81-90.
27. Papanikolaou, A., (2014). Ship design: methodologies of preliminary design. Springer.
28. Paraga Batara Putra, A., (2020). Kajian Bentuk Dan Makna Simbolik Perahu Tradisional Pinisi Di Tanah Beru, Kecamatan Bonto Bahari, Kabupaten Bulukumba (Doctoral dissertation, Fakultas Seni dan Desain).
29. Paroka, D., Azis, M.A., Muhammad, A.H. and Rahman, S., (2022). Alternative Method for Stability Assessment of Indonesian Traditional Wooden Boats. In IOP Conference Series: Earth and Environmental Science (Vol. 972, No. 1, p. 012020). IOP Publishing.
30. Paroka, D., Muhammad, A.H., Rahman, S. and Azis, M.A., (2021), February. Operational limitation of Indonesian traditional wooden boat in the framework of second generation intact stability criteria. In IOP Conference Series: Earth and Environmental Science (Vol. 649, No. 1, p. 012064). IOP Publishing.
31. Parsons, M.G., (2009). Applications of optimization in early stage ship design. Ship Science and Technology, 3(5), pp.9-32.
32. Pawara, M.U., Arifuddin, A.M.N., Tobing, A.Y.L., Hidayat, T., Nurcholik, S.D. and Syadzali, A.M., (2023). Numerical Evaluation of Transversal Strength of Traditional Fishing Vessel in Penajam Paser Utara, East Kalimantan, Indonesia. Indonesian Journal of Maritime Technology, 1(2).
33. Pemerintah Provinsi Sulawesi Selatan, (2019). I Lagaligo Mengalahkan Epos Mahabarata. Available from: https://-sulselprov.go.id/post/i-lagaligo-mengalahkan-epos-mahabarata#:~:text=I%20Lagaligo%20adalah%20karya%20tulis,muasal%20kehidupan%20manusia%20di%20Bumi.-[Accesed 19 April 2024]
34. Priyandhitya, L.I., (2005). Museum Kapal Tradisional Pinisi Ekspresi Kapal Pinisi pada Bentuk Bangunan.
35. Pusat Data dan Informasi Kementerian pariwisata dan Ekonomi Kreatif, (2022). Statistik Pariwisata Dan Ekonomi Kreatif 2020. Available from : https://kemenparekraf.-go.id/statistik-pariwisata-dan-ekonomi-kreatif/statistik-pariwisata-dan-ekonomi-kreatif-2020 [Accesed 19 April - 2024]
36. Putra, H., (2024). Konsep "kampung pinisi-nusantara" sebagai upaya pengembangan¬ ethno-maritime tourism Sulawesi Selatan-IKN yang inklusif dan terkoneksi. Archaeology Nexus: Journal of Conservation and Culture, 1(1).
37. Qodariah, L. and Armiyati, L., (2013). Nilai-Nilai kearifan lokal masyarakat adat Kampung Naga sebagai alternatif sumber belajar. SOCIA: Jurnal Ilmu-Ilmu Sosial, 10(1).
38. Rahmi, S., Kamaruddin, S.A., Adam, A. and Usman, A., (2024). Pengembangan Desain Bentuk dan Makna Pembuatan Kapal Pinisi Berbasis Kearifan Lokal. Journal on Education, 6(4), pp.18406-18416.
39. Ridwan, W. and Sutiyono, D., (2020). Bentuk Kapal Pinisi Sebagai Ide Penciptaan Karya Seni Lukis Dengan Media Tanah Liat. Journal. Uny. Ac. Id.
40. Rulia, A. and Kurniawan, R.S., (2022). Pengembangan Ragam Hias Batik Bertema Arsitektur Vernakular Kalimantan Timur. Panggung, 32(2).
41. Salam, A. and Osozawa, K., (2008). Technological adaptation in the transformation of traditional boats in the spermonde archipelago, South Sulawesi. Japanese Journal of Southeast Asian Studies, 46(2), pp.200-227.
42. Sartini, S., (2004). Menggali kearifan lokal Nusantara: Sebuah kajian filsafati. Jurnal filsafat, 14(2), pp.111-120.
43. Setiawan, W., Trodden, D. and Hu, Z., (2023). Assessment of Dead Ship Condition and Pure Loss of Stability on Indonesian Small Fishing Vessel. In The 2nd International Conference on Marine Research and Technology (ICOMAREST). Newcastle University.
44. Suardi, S., Rahmat, A., Setiawan, W., Pawara, M.U., Alamsyah, A., Arifuddin, A.M.N. and Hidayat, T., (2023). Design a phinisi-type tourist ship to increase tourist interest in vacationing at taka bonerate national park. International Journal of Marine Engineering Innovation and Research, 8(2).
45. Suardi, A.I.W., Pawara, T.M.U. and Alamsyah, T.H., (2022). Patrol ship design to guard the natuna seas. Int. J. Mar. Eng. Innov. Res, 7(3), pp.171-179.
46. Sukardi, A. and Busri, H., (2024). Perubahan dan Kontinuitas dalam Pembuatan Pinisi di Kabupaten Bulukumba. Handep: Jurnal Sejarah Dan Budaya, 7(2), pp.191-211.
47. Suparman, S., Oruh, S., Kamaruddin, S.A. and Agustang, A., (2022). The essence of phinisi ship building for "Punggawa" in bira village of Bulukumba regency. JPPI (Jurnal Penelitian Pendidikan Indonesia), 8(4), pp.1023-1028.

48. Ulfa, A.Y., Pananrangi, A.S.A., Artati, Y., Halijah, H. and Firman, F., (2022), April. Informal Education in the Process of Making Pinisi Boats. In 1st World Conference on Social and Humanities Research (W-SHARE 2021) (pp. 142-145). Atlantis Press.

49. Zarzar, K.M. and Guney, A. eds., (2008). Understanding Meaningful Environments: Architectural precedents and the question of identity in creative design (Vol. 4). IOS press.