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Research Article

From Dayung to DIY: Locally Constructed Maritime Technologies in Coastal Philippine Communities

Enrique E. Balili, Jr.*

Faculty, Southern Leyte State University-Tomas Oppus Campus, Tomas Oppus 6605, Leyte, Philippines

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**Corresponding author:*
E-mail:
ebalili@southernleytestateu.edu.ph

ABSTRACT

This study examines the shift from the traditional *dayung* - a communal boat-launching practice steeped in cooperation and shared labor—to individually crafted and self-reliant ("do-it-yourself)" launching innovations among fisherfolk in the Sogod Bay, Leyte, Philippines. The research uncovers various adaptive practices using semi-structured interviews and thematic analysis, including bamboo sliding mechanisms, detachable wheels, and makeshift floating docks. These locally engineered solutions reflect how coastal communities respond to evolving social, economic, and environmental constraints while preserving core aspects of cultural identity. Anchored in the Social Construction of Technology (SCOT) framework, the findings illustrate how fisherfolk actively reinterpret available resources and repurpose indigenous knowledge to meet livelihood demands, highlighting the community's agency in shaping technology from the margins. This socio-technical evolution underscores the interplay between tradition and innovation, revealing how cultural resilience informs sustainable practices in small-scale fisheries.

Keywords: *Dayung culture, Do-it-yourself (DIY) technology, Social construction of technology, Small-scale fisheries, Cultural resilience*

Introduction

Dayung culture plays a significant role in the everyday lives of fishermen in the Philippines, especially in coastal barangays where fishing remains a vital livelihood. The term *dayung* originates from Cebuano-Bisaya and denotes an act that fulfills a communal need or advances a collective effort. Traditionally. The practice involves moving the fishing boat from the shore to the sea, requiring coordinated teamwork—typically 4 to 5 individuals for small boats and 6 to 8 for larger vessels. Beyond its physicality, *dayung* embodies *bayanihan*—a cultural ethos of cooperation, mutual support, and shared responsibility (Erni, 2025).

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In recent years, however, this cultural practice has become less frequent, particularly in remote barangays, where logistical challenges and changing social dynamics hinder its continuation. The evolution from traditional *dayung* practices has led to innovative, community-driven solutions. These adaptations—mechanical devices, alternative launching methods, or procedural innovations—demonstrate the ingenuity of local fishermen and the capacity of culture to evolve in response to necessity.

According to Harinurdin (2025), a culture of innovation fosters an environment that encourages creative thinking and promotes economic and social value through knowledge. This aligns with the ongoing transformation observed in fishing communities where necessity spurs creativity. While conserving resources like time and labor, technological innovations have also catalyzed cultural hybridization and global connectivity, reshaping practices even in traditionally insular societies.

The interplay between culture and technology is long-standing and reciprocal. As Niroula (2018) points out, a community's culture provides the lens through which technological advancements are perceived, judged, and adopted. Technology fosters cultural continuity and development when aligned with a community's values (Zang & Deng, 2024). However, mismatches can generate friction and lead to the erosion of traditional practices. The shift from conventional *dayung* to unconventional methods reflects the influence of technology on culture and the community's agency in shaping those technologies.

Historically, significant technological shifts—whether in manufacturing, communication, or infrastructure—have challenged and enriched cultures worldwide (Mourtzis et al., 2022). These changes are never unidirectional; while technology alters cultural practices, cultural frameworks simultaneously shape how technologies are understood and utilized.

This study, "Cultural Innovation: Unconventional Approaches Towards the Absence of Dayung Culture," emerged from insights gained in a prior investigation titled *(Dayung) Bayanihan: Reflection of Fisherman Culture*. Initially, the practice of *dayung* was assumed to be a constant, uncomplicated task among fishermen. However, the research revealed logistical difficulties in maintaining the practice, particularly when adequate human assistance was unavailable. In response, local communities developed innovative, non-traditional methods for launching boats—adaptations especially prevalent in isolated barangays. These creative solutions address a practical need and embody evolving cultural expressions inspired by traditional *dayung* values.

Such alternative practices have received limited attention in existing literature despite their relevance. Much of the research on fishing communities emphasizes economic and environmental aspects while overlooking indigenous technological innovations. This gap is especially evident in how communities in the municipalities surrounding Sogod Bay—including Pintuyan, San Ricardo, San Francisco, Liloan, Libagon, Sogod, Bontoc, Tomas Oppus, Malitbog, and Padre Burgos—have locally developed methods in response to the absence of *dayung* (Kockel et al., 2020). This study seeks to fill that gap by documenting these unconventional approaches and examining their origins, cultural significance, and influence on fishing practices.

The primary objective of this study is to identify and analyze the diverse technologies and methods created by fishermen in the municipalities above. Specifically, the study aims to (1) document the unconventional strategies employed in place of traditional *dayung*; (2) explore the cultural inspirations that inform these practices, and (3) assess their implications for preserving Indigenous knowledge and enhancing the resilience of fishing communities.

The theoretical contribution of this research is grounded in the Social Construction of Technology (SCOT) framework and Cultural Anthropology**,** particularly concerning indigenous knowledge systems. SCOT, developed by Bijker and Pinch and further elaborated by Klett (2018), asserts that human action—not technological determinism—shapes the evolution and application of technology. Understanding technology, therefore, requires examining the social contexts in which it is embedded. This theory refutes the notion that technology independently dictates social change

and instead emphasizes that communities actively shape the technologies they use. In the case of Sogod Bay fishermen, their unconventional launching techniques reflect such socially constructed responses to cultural and environmental constraints.

Moreover, SCOT's methodological utility lies in its capacity to analyze technological successes and failures through community dynamics (Klett, 2018). As Zwitter et al. (2025) explain, cultural evolution enables human populations to develop tools and practices that far exceed the capabilities of any single individual, with innovations emerging gradually through collective problem-solving over generations. The practices studied here exemplify this cumulative and adaptive process.

From an anthropological perspective, cultural anthropology explores how people organize and interpret their world, including the tools and technologies they develop (Molek, 2023). Applied anthropology further emphasizes the importance of indigenous knowledge in contemporary development efforts. As Zhang & Deng (2024) argue, integrating indigenous technologies into emerging technological frameworks can promote sustainable development, preserve cultural identity, and protect the environment. When viewed as cultural artifacts, fishermen devise technologies that represent more than functional tools—they embody local wisdom, human values, and social resilience.

Furthermore, Terchila (2025) emphasizes that while technology has created unprecedented opportunities for global interaction and innovation, its usage remains fundamentally shaped by the individuals and societies that adopt it. This underscores the view that the impact of technology must be understood within specific cultural contexts. The adaptive innovations by fishermen, rather than dayung, provide a compelling case of how localized cultural logic continues to inform and guide technological practices.

In summary, this study contributes to the body of knowledge by documenting and interpreting the innovative responses of coastal communities to the declining practice of *dayung*. It highlights the value of viewing technological adaptation as a culturally embedded process driven not by external imposition but by internal creativity and necessity. Through this lens, the research affirms that innovation, especially in Indigenous contexts, is not only a technical process but a deeply cultural one reflective of collective identity, resilience, and agency.

Methodology

Design

This study employed a qualitative research design to explore the unconventional methods and technologies developed by fishermen in Sogod Bay in response to the decline of traditional *Dayung* practices. Qualitative research is appropriate for understanding complex human experiences and cultural dynamics through non-numerical data (Bhandari, 2020). Data were collected through semi-structured interviews and field observations conducted in English and Cebuano, ensuring accessibility and cultural sensitivity. Respondents (n-20) were purposively selected based on criteria such as age (18–65), residence in coastal municipalities of Sogod Bay (including Pintuyan, San Ricardo, San Francisco, Liloan, Libagon, Sogod, Bontoc, Tomas Oppus, Malitbog, and Padre Burgos), and involvement in developing or adopting innovative fishing methods. Purposive sampling allowed the researcher to identify participants with specific insights into the evolving fishing practices (Jordan, 2021). Key informant interviews were also conducted to gather detailed information from individuals with deep community knowledge.

Instrumentation

This study developed semi-structured interview questions to elicit responses from the participants. Following expert review and pilot testing, the two main questions emerged as follows:

1. What new or alternative methods do fishermen use now that the traditional *dayung* culture is no longer practiced?
2. How do these new methods affect the fishermen and their communities?

Data Analysis and Interpretation

The data were analyzed using Braun and Clarke's (2006) six-phase framework for

thematic analysis. This included familiarization with the data, generating initial codes, searching for themes, reviewing and refining themes, naming themes, and producing the final report. Thematic analysis was chosen for its flexibility and effectiveness in identifying repeated patterns of meaning in qualitative data. Transcriptions were translated, coded, and examined to capture emerging ideas, values, and meanings related to cultural and technological adaptation. This process allowed the researcher to connect the fishermen's innovative methods to their cultural heritage, particularly the *Dayung* tradition, and to identify how these practices contribute to the continuity and transformation of indigenous knowledge systems (Caulfield, 2019; Braun & Clarke, 2006).

Ethical Considerations

Informed consent was obtained from all participants before data collection. Given the cultural sensitivity of indigenous practices, the study was conducted with respect for local customs and values. Ethical clearance was granted by the barangay captain and fisherfolk leaders, following community-based research protocols.

Result and Discussion

This section explores alternative boat launching and docking methods Filipino fisherfolk use, highlighting their innovation, sustainability, and cultural resilience. The discussion integrates the implications of each finding to underscore its significance.

1. What alternative methods do fisherfolk use to launch and dock their boats?

Theme 1: Local Adaptations

Fisherfolk have developed creative and practical solutions to the physical and environmental challenges of boat launching and docking. Using locally available materials characterizes these adaptations and demonstrates a continuous evolution of traditional practices shaped by necessity and context.

Category 1: Bamboo-Based Sliding Technique

One of the most prominent adaptations involves using bamboo poles as sliding rollers, which help reduce the physical effort required to move boats. Participant 6 states:

> *"Bisan pa man ug naa mi'y gakit o payao diri, maggamit gihapon mi ug mga kawayan aron malukso ang among bangka paingon sa dagat kay ang uban sa mga kawayan sa gakit o payao kay gipangbungkag na… Nahunahuna namo nga aron magamit pa ang mga kawayan, gamiton namo kini sama sa paggamit sa lubi aron malukso ang bangka*."
>
> ("Even if we have gakit or payao here, we still use bamboo to slide our boat into the sea because some of the bamboo from the gakit or payao have been disassembled… We thought we could make bamboo more useful by using it like coconut palms to slide the boat.")

This technique reduces physical strain while extending the lifespan of boats by minimizing hull abrasion. It also reflects the sustainable use of abundant local resources, which helps preserve financial and material capital for the community. Such resourceful use of bamboo aligns with indigenous technological innovations prioritizing sustainable material use and practical functionality (Yadav & Yadav, 2024). It exemplifies technological bricolage, where communities adapt locally available resources to meet needs innovatively (Maclure & Suddick, 2024). This practice supports ecological design principles that enhance community resilience (Yang et al., 2021).

Category 2: Use of Coconut Palms as Sliding Tools

In areas abundant with coconut trees, fisherfolk utilize coconut palms as natural sliding tools to ease boat launching. Participant 5 shares:

> "*Gigamit nako ang lubi aron malukso ang akong bangka padulong sa dagat kay gisunod nako ang akong nakita sa uban nga mga magpapanagat… Daghan man gud og lubi sa among lugar mao nga gigamit namo kini."*
>
> ("I used a coconut palm to slide my boat to the sea because I followed what I

saw from my fellow fishermen… There are many coconut trees in our area, so we took advantage of it.")

Utilizing coconut palms illustrates adaptive resourcefulness that leverages abundant natural materials, facilitating boat launching while maintaining ecological balance. This practice exemplifies adaptive peer learning and innovation diffusion in tight-knit communities, promoting sustainability through biodegradable resource use (Setiawan et al., 2025).

Category 3: Detachable Wheels Inspired by Land Transport

Some fisherfolk have introduced mechanical innovations by adapting concepts from land transportation to overcome rugged terrain. Participant 7 explains:

"*Ang ideya nga paghimo og matangtang nga ligid para sa akong bangka kay gikan sa akong mga obserbasyon sa mga sakyanang pang-yuta ug sa lisod nga yuta duol sa dagat… Kini maoy nakapadasig sa akong hunahuna nga iangay ang konsepto sa ligid sa akong bangka*."

("The idea to create detachable wheels for my boat was inspired by my observations of land vehicles and the challenging terrain near the sea… This sparked the idea of adapting the concept of wheels to my boat.")

The adaptation of detachable wheels reflects fisherfolk's ability to integrate external ideas into their environment, enhancing autonomy and operational efficiency in challenging terrains. This lateral transfer illustrates frugal innovation (*jugaad),* where resource constraints stimulate cost-effective and practical solutions that enhance community resilience (Lebu et al., 2024).

Category 4: Slanted Latang (Wooden Platforms)

Traditional wooden platforms have been ingeniously modified to facilitate boat launching with less labor. Fisherfolk have adapted the common latang into slanted ramps that function like dry docks, simplifying boat handling. Participant 4 describes:

"*Common kaayo ang latang sa among barangay… lahi lang ang ako kay gigamit nako kini sa duha ka tumong… Aron mapadali ang akong pagpangisda… Nakakuha ko og ideya sa slide form base sa porma sa butang nga malukso kini paingon sa tubig kung nakahilig*."

("Latang is common in the barangay… mine is different because it is used for two purposes… to make my fishing journey more manageable… I got the idea of a slide form based on the object's shape, where it will slide down to the water when it's slanted.")

By slanting traditional *latang*, fishermen have optimized resting platforms for easier boat launching, decreasing labor intensity while maintaining cultural continuity. This modification reflects an intimate understanding of form and function tailored to environmental realities. This adaptation represents an "invention of tradition," balancing continuity and change within maritime cultural practices.

Category 5: Gakit or Payao (Floating Bamboo Platforms)

Floating bamboo platforms remain central to boat launching and docking, reflecting continuity and multifunctionality in maritime traditions. Gakit and payao provide resting platforms for boats and facilitate easier launching. Participant 2 notes:

"*Ang paghimo og gakit o payao sa among barangay dugay na kaayo nga praktis… Kung ibutang namo ang among bangka ibabaw niini para pahulayan… sayon ra usab nga paagi aron ibutang ang bangka sa dagat*."

("The creation of *gakit* or *payao* in our barangay has been practiced for a long time… when we put our boat on top of it to rest… it's also an easy way to put our boats at sea.")

Continued use and repurposing of traditional *gakit* and *payao* demonstrate how

heritage practices integrate with contemporary needs, promoting multifunctionality and operational efficiency in small-scale fisheries. Traditional infrastructure is integral to resilient small-scale fisheries, combining cultural heritage with adaptive ecosystem management (da Silva et al., 2025).

Category 6: Leaving Boats Floating (Inspired by Ships)

Some fisherfolk have adopted offshore anchoring of boats, inspired by larger ships, to minimize labor. Leaving boats floating reduces frequent hauling and physical strain, though it involves trade-offs related to weather and security. Participant 1 shares:

"*Ang ideya nga pabayaan nalang nato ang among mga bangka nga maglutaw sa dagat kay gikan sa konsepto sa dagkong barko… Ug maayo nga ideya kini nga i-aplikar sa among mga bangka*."

("The concept of big ships inspires the idea that we will leave our boats floating on the sea… and it was a good idea to to leave boats afloat.")

Adopting the practice of leaving boats floating reduces labor and risk associated with frequent hauling, but it requires vigilance and reliable anchoring methods to safeguard against weather and theft. It represents a strategic trade-off between effort and risk management. This exemplifies adaptive risk management, which is informed by exposure to external maritime systems, balancing labor reduction and vessel security (Goerlandt, 2020).

2. How do these methods reflect fisherfolk's adaptation, sustainability, and cultural resilience?

Theme 2: Cultural Resilience and Sustainable Practices in Boat Management

These alternative methods illustrate the community's dedication to cultural continuity, environmental stewardship, and self-reliance. Beyond innovation, these methods underscore the fisherfolk's commitment to preserving cultural heritage while practicing environmental stewardship and fostering community resilience.

Category 1: Transmission of Traditional Knowledge

Passing boat management techniques from elders to younger generations ensures cultural continuity. Participant 2 highlights this intergenerational knowledge:

"*Dugay na kini nga tradisyon… gisunod pa sa among mga apohan… nagpakita sa kaalam ug kahibalo nga napanunod gikan sa mga katigulangan.*"

("This has been a long-standing tradition… practiced by our grandfathers… showcasing the wisdom and knowledge inherited from ancestors.")

Intergenerational knowledge transfer ensures the persistence of adaptive practices, reinforcing community identity and sustainable resource management. This reflects the importance of traditional ecological knowledge in enhancing community adaptive capacity (Mallick et al., 2024).

Category 2: Sustainable Use of Local Materials

The responsible use and maintenance of bamboo and coconut materials reflects a strong environmental ethic. Observations reveal ongoing care:

"*Gikuha sa magpapanagat ang lubi gikan sa tubig aron malikayan ang kadaot sa kalikupan… Gigamit usab pagusab ang lubi sunod higayon.*"

("The fisherman removes the coconut palm from the water, minimizing any potential environmental impact… the palm is reused next time.")

"*Gatan-aw sila sa kawayan kung adunay kadaot ug ginarepair o ginalisan kini kung kinahanglan*."

("They inspect the bamboo for any signs of wear or damage and perform necessary repairs or replacements.")

Fisherfolk's careful maintenance and reuse of bamboo and coconut palm demonstrate an intrinsic environmental ethic that supports

ecosystem sustainability. These practices illustrate ecological rationality, aligning human activity with ecosystem capacity and promoting sustainability (da Silva, 2025).

Category 3: Resourcefulness and Self-Reliance

The occasional unavailability of labor has fostered autonomy and inventive problem-solving among fishermen.

> "*Dili gyud malikayan nga bisan daghan mi diri nga mga magpapanagat, usahay wala gyud'y motabang namo sa Dayung o Dahik, mao nga naa mi'y mga pamaagi ug gamit aron makatabang sa among kaugalingon."*
>
> ("It is inevitable that even though there are many of us fishermen here, there are times when there are none to help us do Dayung or Dahik, so we usually have these methods and tools to help ourselves.")

The fisherfolk's development of independent solutions during labor shortages enhances community resilience and reduces dependency on external assistance. This self-reliance is critical for social-ecological resilience in resource-dependent communities (Bauer et al., 2022).

Category 4: Contextual Innovation and Practicality

Environmental challenges like rocky terrain stimulate creative adaptations that meet local needs. Participant 7 recalls:

> "*Nakasinati ko og kalisod tungod sa lisod ug bato nga lugar… Nakapukaw kini sa akong huna-huna nga i-adapt ang konsepto sa ligid sa akong bangka*."
>
> ("I encountered difficulties due to the rugged and rocky terrain… it sparked the idea of adapting the concept of wheels to my boat.")

Environmental challenges motivate context-specific innovation, showcasing fisherfolk's ability to tailor solutions to local conditions. Such grassroots innovation under constraint exemplifies bottom-up development and community-driven problem-solving (Oliveira et al., 2023; Pereira et al., 2024). These findings collectively highlight how Filipino fisherfolk creatively adapt their traditional knowledge and resources to meet modern challenges, sustaining cultural identity while promoting environmental and social resilience.

Summary of Themes and Categories

Table 1 highlights the practical ingenuity of Filipino fisherfolk through locally adapted boat launching methods such as bamboo rollers, coconut palms, and detachable wheels. These innovations show how communities repurpose available resources to address labor and terrain challenges, reflecting grassroots problem-solving and frugal innovation.

Table 1: Summary of Themes and Categories

Themes	Categories
Local Adaptations	1. Bamboo-Based Sliding Technique
	2. Use of Coconut Palms as Sliding Tools
	3. Detachable Wheels Inspired by Land Transport
	4. Slanted *Latang* (Wooden Platforms)
	5. *Gakit* or *Payao* (Floating Bamboo Platforms)
	6. Leaving Boats Floating (Inspired by Ships)
Cultural Resilience and Sustainable Practices	1. Transmission of Traditional Knowledge
	2. Sustainable Use of Local Materials
	3. Resourcefulness and Self-Reliance
	4. Contextual Innovation and Practicality

The theme of cultural resilience emphasizes how knowledge is passed down across generations and how natural materials are reused sustainably. These practices not only preserve ecological balance but also maintain cultural identity amid changing conditions.

These insights call for policy support that values and builds on community-led practices. Local governments and fisheries agencies should promote knowledge transmission, support traditional tools, and align development programs with indigenous innovations for more resilient small-scale fisheries (Enayati et al., 2024; Caldeira et al., 2025).

Conclusion

This study reveals the creative and adaptive responses of Filipino fisherfolk to the decline of the *dayung* culture, particularly through innovations such as bamboo sliding techniques and detachable boat wheels. These practices exemplify technological bricolage, where indigenous knowledge systems and locally available materials are harnessed to address pressing challenges like labor shortages and rugged coastal terrain.

Such community-driven solutions highlight not only the ingenuity but also the resilience of coastal communities in sustaining their livelihoods while preserving cultural values. By integrating traditional materials like bamboo and coconut palms with mechanical concepts inspired by land-based transport, fisherfolk achieve operational efficiency without compromising ecological sustainability. These practices, passed down through generations, serve as a form of living heritage that strengthens communal identity and solidarity amid ongoing environmental and socio-economic pressures.

This study challenges linear and top-down models of technological change by emphasizing the role of marginalized communities as active agents in shaping their own tools and systems. As such, local governments and fisheries agencies should recognize, document, and integrate these grassroots innovations into community-based fisheries policies and development programs to ensure culturally grounded, sustainable, and inclusive coastal resource management.

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