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The Implementation Path of "Endogenous Development" in the Transformation of Fishing Ports and Spatial Design: A Case Study of Xiangzhi Fishing Village in Quanzhou City

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Abstract: Fishing harbors often face a range of challenges during their transformation process, including cultural disruption, spatial alienation, the erosion of vernacular values, harm to the interests of local villagers, and a lack of sustainable development momentum. In response, this study explores a sustainable and endogenous approach to transforming and renewing fishing villages. Grounded in the theoretical framework of endogenous development, the paper constructs a transformation model for fishing harbors driven by internal dynamics. It emphasizes the spatial dimension of fishing ports as a key node within the broader fishing village system, serving the integrated functions of production, living, and ecology, and presents an empirical case study of Xiangzhi Fishing Village in Quanzhou, a representative example. The study proposes a design model based on the synergistic interaction of local elements, spatial carriers, and principal actors. The findings suggest that this model not only offers a practical pathway for the sustainable transformation of traditional fishing villages but also provides theoretical guidance and a reference framework for similar regional development efforts.

Keywords: Endogenous development; Fishing village transformation; Fishing port spatial renewal; Sustainable design; Place-based approach

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Introduction

In recent years, the transformation of fishing villages has continued to advance, yet prevailing renewal strategies remain constrained by externally driven development paradigms prioritizing economic growth. Although infrastructure upgrades and industrial substitutions may boost the economy in the short term, they often overlook local communities' cultural demands and ecological wisdom. For example, standardized waterfront landscapes and commercialized harbor renovations may increase land value. Still, they also contribute to the disappearance of productive spaces, the fragmentation of community networks, and the fading of cultural memory. Such "de-localized" practices expose a fundamental tension between modernist narratives and local adaptability.

To address the challenges mentioned above, this study adopts the theoretical perspective of endogenous regional development to reconcile the seemingly conflicting relationship

between the transformation of fishing villages and local needs. By extending this theory into the domain of spatial design, the research proposes a development pathway for traditional fishing villages that positions their spatial environment as the carrier of transformation, fishermen as the principal actors and users, and traditional culture and natural resources as key developmental elements. The aim is to activate endogenous development dynamics, fostering the growth of local actors and, in turn, driving regional transformation and sustainable progress.

By employing a three-dimensional synergistic spatial design strategy—comprising local elements, spatial carriers, and principal actors—this study proposes a context-specific development pathway for preserving, transmitting, and revitalizing traditional cultural essence. The proposed framework emphasizes the integration of modern development needs with the preservation of cultural identity and ecological ethics, thereby enhancing the overall value of fishing village spaces in terms of quality of life, production efficiency, and environmental livability.

As the convergence point of the three-core functions—production, living, and ecology—the fishing harbor space embodies the local cultural structure and regional operational logic, making it both highly integrated and representative. This study selects Xiangzhi Fishing Harbor in Quanzhou, China, as its research site. With its rich historical background and deep-rooted fishing traditions, along with a complex spatial structure and diverse user groups, Xiangzhi provides an ideal case for examining the complexity and locality involved in the transformation of traditional fishing villages. By analyzing its spatial organization, place-based resources, and community needs, the study seeks to expand the scope of transformation objectives, enhance the inclusiveness and coherence of service targets, and fully leverage the harbor's multifunctional potential in cultural preservation, community cohesion, and ecological governance, ultimately promoting a sustainable transformation pathway for traditional fishing villages.

1. Endogenous Development Theory

Against the backdrop of ongoing global urbanization, historic and traditional areas are increasingly marginalized as the cost of urban expansion, facing resource depletion, functional decline, and spatial neglect [1]. In response, diverse regions have explored three primary developmental trajectories and theoretical models: exogenous development, endogenous development, and neo-endogenous development.

The concept of "endogenous development" was first introduced by Japanese thinker Kazuko Tsurumi in the 1960s and was later systematized by the Dag Hammarskjöld Foundation at the United Nations Economic Assembly in 1975 [2]. Since then, it has gained wide acceptance. As a response to the long-standing dominance of exogenous development models, which often result in local resource dependency, cultural erosion, and weakened autonomy [3], endogenous development theory advocates for local communities to serve as the primary agents of development. It emphasizes utilizing local natural, ecological, and cultural resources, and promotes sustainable development pathways [4] rooted in local contexts through the autonomous selection and integration of external resources. In doing

so, it fundamentally challenges the state- or capital-centric, top-down development paradigm.

In the 21st century, addressing the idealism and capacity limitations associated with earlier endogenous development practices, British scholar Christopher Ray proposed the "new endogenous development" [5] theory based on insights from the European Union's LEADER project. This framework moves beyond the traditional binary opposition of "internal vs. external," [6] emphasizing a dynamic development mechanism characterized by "local leadership–external synergy." It advocates the integration of multiple collaborative mechanisms while preserving local autonomy, thereby enhancing the resilience and overall synergy of local development efforts (**Figure 1**).

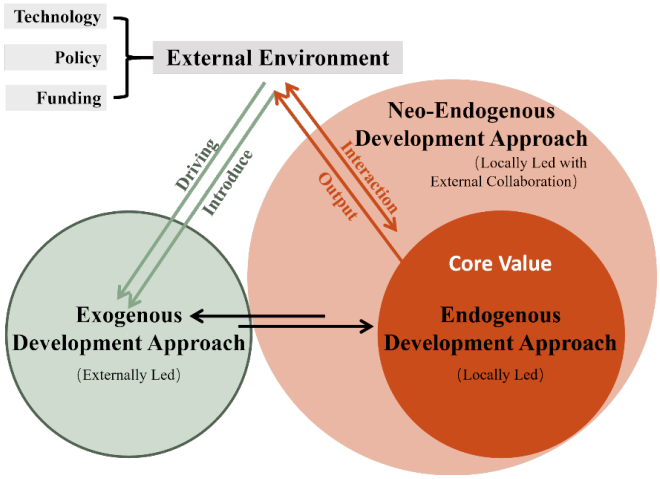


Figure 1. Diagram of the Relationship Between Exogenous Development, Endogenous Development, and Neo-Endogenous Development (drawn by Yuying Wang)

In the field of spatial design and planning, there has been a growing academic focus on endogenous development in recent years, with the research shift extending from macro-level regional development to micro-level spatial renewal. For instance, numerous studies have pointed out that the traditional "top-down" planning model often detaches spatial design from local realities, making it difficult to truly stimulate community potential [7]. Nick R. Smith, in his study of urban fringe areas in China, highlighted that the "institutional gray zone" between urban and rural areas makes a singular top-down or bottom-up model ineffective. Only by integrating multiple stakeholders and promoting "negotiated" planning [8] can local adaptability and a sense of participation be enhanced. Similarly, Chikami Odai (2015) introduced the concept of "building a collaborative society," emphasizing that the collaboration of local talent and diverse actors is crucial for endogenous transformation at the local level [9].

Existing studies have proposed multiple approaches to spatial design strategies based on local contexts, including integrating regional resources, extracting spatial vocabulary, spatial functional diversification, ecological restoration, and cultural empowerment [10]. J. L. Gao emphasizes that rural spatial development paths should be chosen based on local endowments, selecting development models that align with these conditions, avoiding the pitfalls of "one-size-fits-all" planning [11]. Scholars such as Gan Liang have developed an

evaluation model based on the "Village and Town Vitality Assessment" system in Bavaria, Germany, which covers six dimensions: management structure, population structure, land use, service accessibility, public participation, and employment capacity. This model provides a comprehensive quantitative tool and indicator system for endogenous development in spatial planning.

In summary, endogenous development theory has evolved from an initial conceptual proposition to a more mature stage of theoretical refinement and methodological systematization. Contemporary academic interpretations of the theory generally follow two main trajectories: first, there is an increasing emphasis on restoring the "right to development" to local communities, accompanied by innovations in governance mechanisms; second, a spatial-practice-oriented approach has emerged, focusing on the integration of regional resources, cultural heritage, and community participation. However, much of the current research remains fragmented, often drawing selectively from theoretical discourse or case-based practices, without establishing a coherent and comprehensive theoretical framework. Future studies should focus on analyzing the operational logic of endogenous development mechanisms in practice to strengthen their theoretical robustness and practical applicability [12].

1.1. Theoretical Practice and Case Studies

Building upon deepening theoretical explorations, the practical implementation of "endogenous development" has also advanced in various regions worldwide. In particular, Europe and Japan have applied the theory more extensively and systematically, accumulating a wealth of policy experience and empirical case outcomes.

In Europe, the "LEADER＋" initiative implemented by the European Union is widely regarded as a significant practical embodiment of the "endogenous development" concept. This program emphasizes a bottom-up participatory approach by establishing a Local Action Group, composed of governmental entities and civil society organizations, which enables the direct involvement of residents in development planning and decision-making. The initiative seeks to enhance local agency, foster collaborative networks, and stimulate endogenous potential by integrating local resources and promoting cross-sectoral cooperation to achieve community-led sustainable development. LEADER＋ effectively merges endogenous dynamics with selective exogenous inputs to construct a governance model driven from within the region. This model has been further localized through initiatives such as Spain's PRODER program, which supports rural revitalization. However, implementing LEADER＋ has also exposed particular vulnerabilities inherent in endogenous mechanisms. Regions with stronger development foundations are likelier to establish a virtuous growth cycle, whereas resource-constrained areas risk further marginalization [13]. Moreover, participatory processes sometimes remain superficial, with Local Action Groups lacking substantive decision-making power. Additionally, the sustainability of such initiatives is often undermined by fluctuating funding cycles and inconsistent policy support.

In Japan, the "One Village, One Product" movement initiated in Oita Prefecture is a

representative example of endogenous development in practice [14]. This initiative advocates for creating regionally distinctive products and services by leveraging local resources and traditional industries at the village level, intending to establish a self-sustaining local economic system. The model emphasizes community initiative, cultural continuity, and economic localization, making it a hallmark case of endogenous development. It is frequently compared with China's "Southern Jiangsu Model" as both reflect a deep integration of cultural heritage and economic revitalization, underscoring how localized identity can serve as a foundation for sustainable development.

In comparison, China's "endogenous development" practice often manifests as a process interwoven with local exploration and policy promotion. However, in practice, the trend of multi-dimensional collaboration advocated by the "new endogenous development" has gradually become more apparent.

1.2. Analysis of Fishing Harbor Transformation and Design under the Theory of "Endogenous Development"

Fishing harbors [15], as integrated fishery bases comprising natural or artificial waters, wharves, and adjacent land areas, serve not only as vital infrastructure for marine fishing and aquaculture but also as central spaces for the livelihoods of fishing communities. As both the material embodiment of a fishing village's social structure and the spatial field of its everyday practices, the harbor encapsulates traditional ways of life and reflects the intricate fabric of local culture and social relations. Consequently, the spatial design and transformation of fishing harbors possess not only significant economic value but also profound social and cultural implications, exerting a systemic influence on the holistic transition and revitalization of traditional fishing villages.

Current transformation practices of fishing ports are predominantly driven by the core logic of "economic growth," with a focus on vertical expansion paths such as industrial upgrading and tourism development, while neglecting the horizontal exploration of social and cultural dimensions. As long-term users of fishing ports, the needs of fishermen in areas such as daily activities, cultural heritage, and community network maintenance have not been adequately addressed. During the planning process, their practical demands and emotional connections are often marginalized, leading to the gradual erosion of the port's identity and local characteristics [16]. This "de-localized" design thinking has resulted in the homogenization of spatial aesthetics and a rupture in cultural memory, which hampers the formation of sustainable development.

At the academic level, research on fishing port spaces in China has remained mainly within design practice, and a comprehensive theoretical framework has yet to be fully established. Existing studies primarily concentrate on the multifunctional transformation of fishing ports [17], with research topics spanning dock layout optimization [18], architectural design [19], ecological landscape creation [20]. and other design-oriented domains. Regarding transformation strategies, the literature often highlights principles such as functional integration, spatial locality, environmental sustainability, and transportation accessibility, while simultaneously addressing the balance between renewal and preservation [21].

However, these studies are predominantly driven by commercial logic, placing insufficient emphasis on the residential and ecological dimensions of fishing port spaces. At the level of spatial service targets, there is a noticeable bias toward enhancing the perceptual experiences of external tourists. At the same time, the subjective needs, participatory willingness, and agency of local residents remain underexamined. In spatial design and planning, the focus continues to be on physical spatial renewal, with limited inquiry into the cultural lineage and spirit of place embedded within fishing harbor environments. Furthermore, there is an absence of robust, longitudinal tracking and feedback mechanisms to evaluate the post-transformation use of space, changes in community structure, and the continuity of cultural heritage.

Design should be viewed as a tool to serve the public interest, where its value lies not in the mere manifestation of form, but in responding to real needs and promoting social well-being [22]. From this perspective, the current transformation of fishing ports and their spatial design must move beyond a singular focus on economic interests and return to an "endogenous development" approach centered on the locality. By taking into account fishermen's perspective, it is essential to reconstruct the functions, cultural identity, and social mechanisms of fishing port spaces. This approach can foster the creation of a sustainable transformation model where economic, ecological, and social factors coexist and interact synergistically.

1.3. Theoretical Framework Construction: Transformation Path of Fishing Villages from the Perspective of Endogenous Development

Christopher Ray points out that rural development is not solely focused on the "rurality" itself, but rather on the process of socio-economic revival in regions with rural characteristics through the intersection of multiple forces [23]. As a regional development paradigm, the theory of "endogenous development" emphasizes the small-scale "region" as the basic unit and defines it as a place where settlers, wanderers, and temporary residents form social connections and common bonds through interaction, aiming to ensure the possibility of "bottom-up" development and governance by local actors [24].

Fishing villages are a typical example of complex spatial units characterized by "small scale, multiple actors, and diverse practices": on the one hand, the long-established fishing community forms the foundational basis for local identity; on the other hand, with the development of rural tourism and the marine economy, the continuous influx of external tourists, entrepreneurs, and other short-term users creates a dynamic social relationship and spatial order through the interaction of local and external forces. Against the backdrop of rapid urbanization and external capital intervention, fishing villages face issues such as cultural pressure, the marginalization of local knowledge, and the alienation of spatial functions—core issues that the theory of "endogenous development" seeks to address and resolve. Therefore, this theory provides compelling and practical theoretical support for the sustainable transformation of fishing villages.

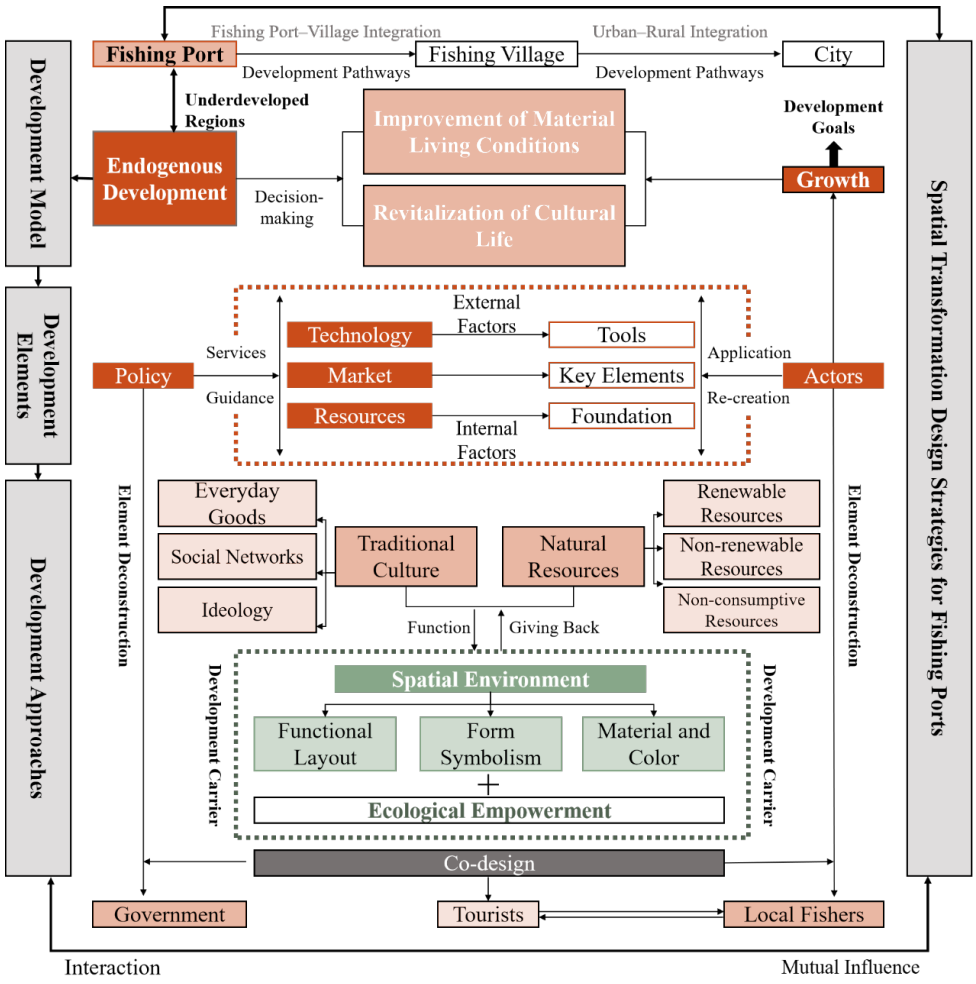


Figure 2. Framework Construction of Fishing Village Transformation Path from the Perspective of Endogenous Development (drawn by Yuying Wang)

In the context of fishing village transformation, endogenous development theory offers a systematic pathway. From the perspective of development dynamics, endogenous growth is driven by the synergistic interaction of five core elements: resource base, technological tools, market mechanisms, policy frameworks, and local actors. Each region formulates adaptive strategies tailored to its specific context, drawing upon these elements. In the setting of fishing villages, the resource base forms the fundamental foundation for development, encompassing natural resources such as marine ecosystems, coastal landscapes, and settlement spaces, as well as cultural assets including local knowledge, folk beliefs, and collective memory. These resources are activated and regenerated by applying technological tools—for instance, upgrading traditional industries, promoting multifunctional fisheries, and integrating digital platforms—thereby enhancing their adaptability and communicative capacity.

Market mechanisms provide directional guidance by facilitating external connections and monetization through tourism, branding, and product valorization. Policy frameworks define institutional boundaries and create incentive structures that legitimize and support local innovation. Local actors—particularly fishers—play a central role in integrating and advancing development within this structure. As key nodes linking various elements, they

mobilize indigenous knowledge and collective agency, and through practice, transform static resources into dynamic developmental forces, thereby establishing an endogenous development path driven by principal actors' initiatives.

In this process, space serves not only as a physical platform for development but also as a crucial medium for resource translation and value manifestation. Traditional natural and cultural resources are "translated" into tangible expressions through spatial design, reflected in the integrated strategy of functional layout, the local vernacular of materials and forms, and the construction of symbolic expressions. Space thus makes the regeneration of resources both perceptible and actionable, becoming a pivotal point in the path of endogenous development.

At the same time, the institutionalized participatory mechanism transforms space into a platform for interaction and collaboration among various stakeholders. By stimulating the agency of fishermen and fostering collaboration with multiple actors, including tourists, government entities, and social organizations, the entire participation process is advanced, from resource awareness and spatial governance to cultural regeneration. This enhances the "material living conditions" and contributes to the reconstruction of the "cultural living system," further promoting the development of the fishing village's subjectivity and the formation of the system's self-organizing capacity. Ultimately, through the organic coupling of space and development logic, the fishing village will achieve a sustainable transformation, shifting from a traditional production space to an "integrated fishing port and village—urban and rural integration" (**Figure 2**).

2. Strategy Construction

2.1. Translating Theory into Practice: Extracting Endogenous Development Features in Spatial Design

Space is not merely a collection of physical forms, but a comprehensive carrier of social relationships, cultural meanings, and developmental logic. In the process of regional transformation, different types of spaces bear varying degrees of complexity in the issues they confront. As the core node of fishing village development, the fishing port not only embodies the production and daily life of fishers but also carries the evolution of traditional culture, local identity, and social structures.

Fishing port spaces are characterized by higher functional integration and a stronger sense of place than typical rural spaces. Thus, spatial restructuring and actor collaboration are especially critical in their transformation. Through strategic spatial design interventions, the renewal of fishing villages can achieve a shift from mere "physical restoration" to a more profound "reconstruction of social space." This enables a departure from the current fragmented and superficial approaches to transformation and advances toward a more systematic and sustainable developmental trajectory.

2.1.1. Co-creation and Community Empowerment

Space should no longer be designed for the local context, but rather co-created by the local community. The design process must emphasize the agency of local residents, enhancing

their participation, autonomy, and sense of ownership. Co-creation mechanisms—such as community-based design negotiations, spatial forums, and public workshops—not only improve the responsiveness of design to local needs and project sustainability [25], but also foster residents' self-expression, self-awareness, and capacity development in spatial practices. At the same time, it is essential to establish a multi-stakeholder platform involving government, designers, residents, and businesses, in order to restructure power relations in the process of spatial production, challenge one-dimensional design hegemony, and promote community empowerment and knowledge co-creation.

2.1.2. Cultural Embedding and Knowledge Visualization

Spatial design must not only preserve the material traces of traditional culture, such as fishing tools, fishing houses, and boats, but, more importantly, it must activate the memory of local culture and the mobility of intangible knowledge. Cultural resources, including local experiences, traditional skills, and oral histories of fishing villages, should be translated into spatial language, allowing them to regenerate within a renewed context. This approach fosters a deeper sense of cultural identity for both residents and tourists [26]. The design should avoid superficial representations of culture, instead delving into and visualizing local knowledge, transforming space into a medium for cultural dissemination and inheritance.

2.1.3. Local Resource Utilization and Ecological Resilience Design

Grounded in an understanding and respect for local natural resources, such as the ocean, mudflats, wind, salt, and tides, spatial design should strive for a harmonious coexistence with the ecosystem, avoiding the tendency to treat these elements merely as fragmented "landscapes" or "symbols." At the same time, attention must be given to the contemporary expression and appropriate transformation of traditional ecological wisdom, such as the fishermen's concept of feng shui, building orientation, and drainage practices. Although these may appear as "non-mainstream" knowledge systems, they embody profound ecological adaptive logic and should be integrated as vital components of the ecological resilience strategy.

2.1.4. Incremental Intervention and Multi-Group Inclusivity

Endogenous development emphasizes the gradual and adaptive nature of progress. Consequently, design strategies should prioritize flexibility and minimal disruption. Rather than relying on large-scale demolition and construction, a focus on "small-scale, gradual progression, and high adaptability" is recommended. This approach enables spaces to undergo self-renewal in response to the dynamic nature of social practice. Additionally, the design must consider the diverse needs of various demographic groups, including differences in age, occupation, and lifestyle. It should reflect inclusivity and diversity through its scale, form, and functionality, ultimately contributing to the creation of a more socially resilient public space system.

2.2. "Local Elements – Spatial Carriers – Principal Actions: Constructing a Dynamic Synergy Model"

In the practice of local spatial transformation, traditional design paradigms that prioritize function or aesthetics often struggle to address the complex interactions between local

socio-cultural factors, ecological resources, and community stakeholders. This paper introduces a dynamic synergy model of "local elements-space carrier-subject action," which challenges the conventional linear development model of "space for function," "culture for tourism decoration," and "space for tourism." It dismantles the traditional logic of "space as functional service," "culture as tourism decoration," and "residents as management objects," emphasizing the dynamic interplay and interconnection among these three components. The model demonstrates how local culture and natural resources can activate subjectivity through spatial translation mechanisms, thereby facilitating the symbiotic development of cultural identity reconstruction, local knowledge reproduction, and spatial multifunctionality.

The model conceptualizes "local elements" as the foundation of the system, encompassing natural, cultural, historical, and productive resources, which form the value base for spatial renewal. "Spatial carriers" serve as the intermediary channel, facilitating the material translation, functional reconstruction, and scene creation of local elements. As intermediaries, spatial carriers establish the essential framework for the subject's practices, translating local elements, reconstructing functionality, and creating meaningful environments. Meanwhile, "subject actions" involve diverse individuals, such as fishermen, residents, and tourists, who construct meanings and provide feedback to the local space through participation, cognition, and use, driving the system's self-evolution.

The relationship among the three is not a linear hierarchy but a continuous, cyclical, and bidirectional interactive process: local elements inspire and provide content for the space, the space design accommodates and responds to the needs of the subjects, and the subjects, through their actions, reinterpret the value of the elements and the significance of the space (**Figure 3**).

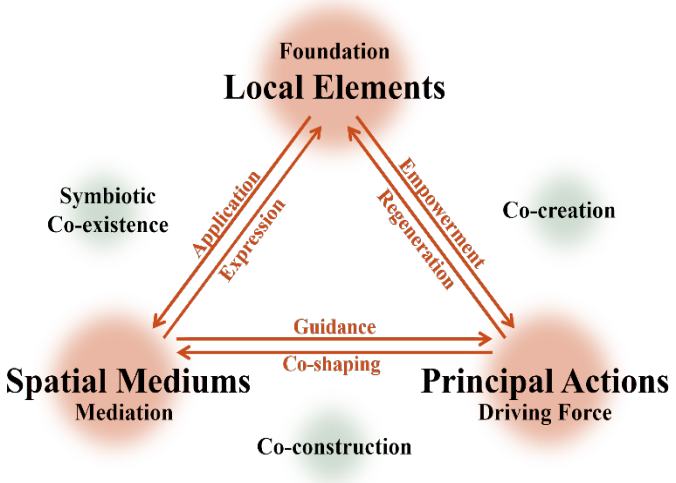


Figure 3. A Dynamie Synergy Model of Local Factors, Spatial Carriers, and Principal Actions (drawn by Yuying Wang)

Thus, the model not only reveals the spatial expression pathway of the generative mechanism of locality in endogenous development but also offers a more culturally responsive and socially dynamic theoretical framework for local spatial-complex transformation.

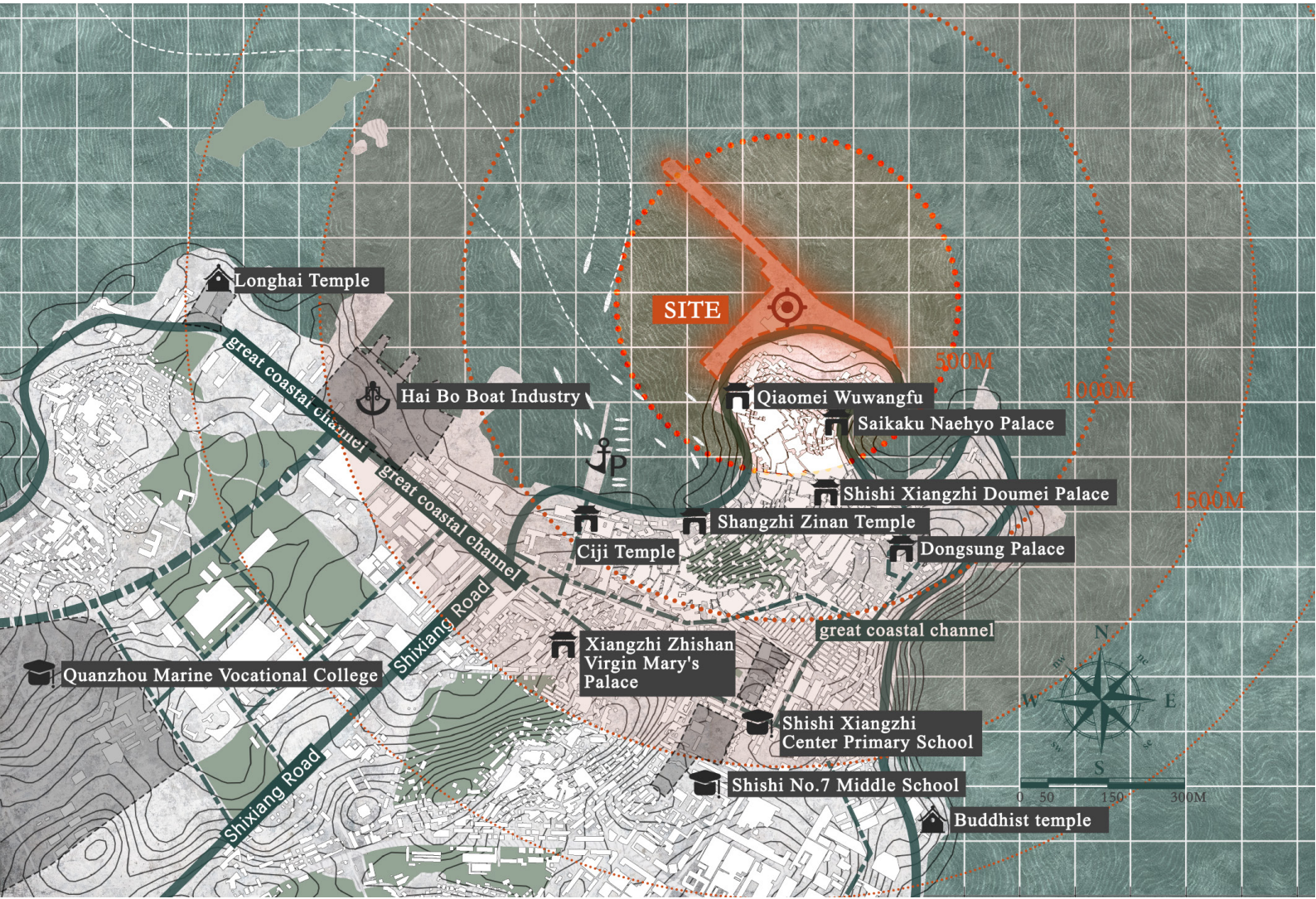
3. Design Practice

3.1. Preliminary Empirical Study: Case Overview and Local Elements Analysis

3.1.1. Geographical Location and Industrial Structure

Located in Xiangzhi Town, Shishi City, Quanzhou, Fujian Province, Xiang Fishing Village is a typical coastal fishing village that has developed around Xiangzhi Fishing Harbor. The village currently operates 564 fishing vessels, with a total power of 203,700 kilowatts and a total tonnage of 65,000 tons. Approximately 15,000 people are directly involved in the fishing industry and related processing services. Fishery production and aquatic product processing are the village's dominant economic activities, with light industries such as freezing, aquatic product dyeing and finishing, and beverages serving as the main support. There are 25 freezing enterprises in the village, holding an inventory of up to 40,000 tons, positioning it among the leaders in the aquatic product processing industry in Quanzhou (**Figure 4**).

Figure 4. Geographical Location Analysis Map (drawn by Jialin Li)



However, despite the fishery and aquatic product processing industry chain reaching a certain scale, Xiang Fishing Village remains underdeveloped in its extension to the tertiary industry [27]. Sectors such as tourism services, leisure experiences, and cultural creativity are still in their infancy. One key issue is that the village's spatial organization lacks the ability to integrate ecological, cultural, and living scenes, hindering its capacity to meet the demands of industrial diversification and spatial function integration. As a result, Xiangzhi Fishing Harbor plays a critical role as a key node in the spatial and industrial development of Xiang Fishing Village.

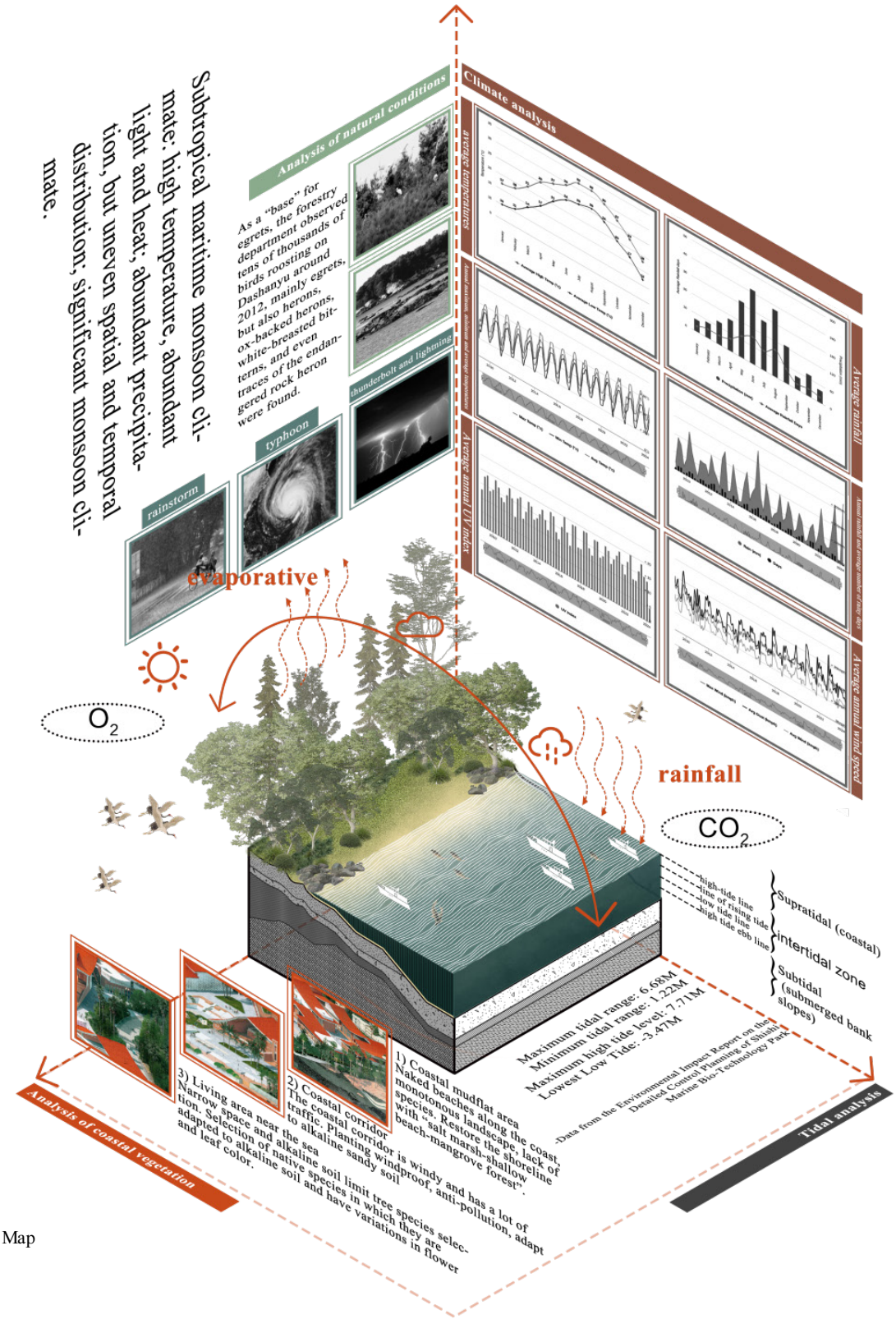


Figure 5. Natural Resources Analysis Map (drawn by Jialin Li)

3.1.2. Natural Resources

Located in the low-latitude coastal area near the Taiwan Strait, Xiang Fishing Village falls within the typical subtropical oceanic monsoon climate zone. The region is warm and humid year-round, with ample sunshine. The prevailing northeast wind dominates the winter months, while the southwest wind prevails in the summer. Monsoon changes are significant, and typhoons, torrential rains, and other extreme weather events frequently impact the area. These natural conditions profoundly influence the fishing rhythm and daily life of the village's fishermen.

According to the "Environmental Report on the Detailed Planning of Shishi Marine Biological Science and Technology Park," the local sea area experiences significant tidal differences, with the maximum tide level reaching 7.71 meters and the minimum tide level at -3.47 meters. This makes it a typical coastal area with large tidal fluctuations. Such tidal changes not only shape important ecological resources, such as coastal wetlands and mudflats, but also impose higher adaptability requirements for the spatial design of harbor facilities, fishing boat docking, and flood control and drainage systems (**Figure 5**).

Figure 6. Topographic Analysis Map (drawn by Jialin Li)

The topography of the fishing village is characterized by a "high in the south and low in the north" pattern, with a wide distribution of hills and mountains, creating a typical "mountain-sea blending" landscape. A 300-meter-long mountain range running north-south cuts through the residential area and extends to the design site, creating a vertical overlap between the natural landscape and the settlement space. The region features several small hills, with the highest point being Yandun Hill in the northwest, which rises to an elevation of 57.8 meters above sea level. Most of the village's buildings are situated on the mountains, contributing to a unique spatial texture typical of mountain towns (**Figure 6**).

The typical monsoon climate, coastal environment with a large tidal range, and the intermingled landscape of mountains and the sea in Xiang Fishing Village have not only profoundly shaped the village's ecological landscape and settlement pattern but also fostered a local knowledge system deeply integrated with nature. This symbiotic relationship between nature and culture provides a rich resource base and guiding direction for spatial renewal.

3.1.3. Cultural Foundations

Xiang Fishing Village is deeply embedded in a multicultural context, blending fishing culture, silk culture, and religious traditions. These elements form the core foundation of the villagers' emotional identity and collective memory of the place. The cultural resources are not only reflected in traditional festivals and folk activities but also profoundly influence the village's spatial organization, social structure, and way of life.

(A) Fishing Culture: Co-Construction of Life Rhythms and Spiritual Bonds

The "Fishermen's Cultural Festival," held on the 13th day of the 5th month of the lunar calendar, is the most representative annual event in Xiang Fishing Village. It features a variety of folk activities, including Gaojia Opera, fireworks, Nanyin singing, lion dances, lantern riddles, and rope catching on the sea. This festival not only highlights the rich intangible cultural heritage of the village but also strengthens the emotional bond among villagers. Simultaneously, traditional fishing techniques, boat building, the unique rhythm of life within fishing families, and the practice of sea worship—passed down through generations—form a cultural practice rooted in a deep connection to the sea. These practices embody the "sea-based" cultural roots of Xiang Fishing Village, reflecting the community's respect for and reverence of the sea in their daily lives.

(B) Maritime Silk Road Culture: The Intersection of Historical Memory and Spatial Heritage

As one of the key nodes of the ancient Maritime Silk Road, Xiang Fishing Village was once a vital shipping channel and shipbuilding base, accumulating a rich tradition of Haisi culture. This culture has influenced not only the local language, customs, food, and handicrafts but also the spatial layout of the village and the evolution of harbor functions. In particular, the village's overseas Chinese heritage has fostered strong connections with Southeast Asia, Taiwan, and other regions, creating a unique cross-regional cultural network. This network brings new possibilities for future spatial regeneration and potential for linking with external resources.

Figure 7. Cultural Analysis Map (drawn by Jialin Li)

(C) Religious Culture: The Interweaving of Sacred Spaces and Public Life

Xiangyu Village and its surrounding area are home to seven major religious spaces, including the Holy Mother's Palace, Doumei Palace, Longhai Temple, Ganlu Temple, Qingjing Temple, Xiangxi Temple, and Ciji Temple. These religious sites not only serve ceremonial functions, such as praying for blessings and conducting rituals, but also act as important hubs for daily interactions and festive gatherings within the community. During traditional festivals and religious celebrations, temple activities play a vital role in fostering community identity and preserving cultural rituals, thereby enriching the village's public cultural ecology.

The multi-layered cultural roots of Xiangyu Village not only preserve the local identity of its inhabitants but also constitute a spiritual foundation and valuable resource for spatial renewal. These cultural elements offer the potential for cultural translation in future spatial design, ensuring that local transformation is not merely a reconstruction of form, but a process of identity reshaping and cultural co-creation (**Figure 7**).

3.1.4. Main Body Structure and Community Characteristics

With the decline of traditional fisheries and the rise of coastal tourism, the original residents of Xiang Fishing Village are primarily middle-aged and elderly, with a noticeable outflow of young people, exacerbating the village's "hollowing out." At the same time, there is a constant influx of transient populations, including tourists, cultural and tourism workers, and researchers. This results in short-term, weakly-connected community relations. The community structure is becoming increasingly diverse, evolving into a composite of "old fishermen + new seafarers."

The elderly fishermen comprise local residents who rely on traditional fishing as their primary means of livelihood, as well as seasonal fishermen and aquatic product vendors who come to work at the port. They are the direct inheritors of marine culture, with their activities mainly focused on fishing operations, daily life, leisure, and community interaction.The "new seafarers" refer to external groups that visit the village for cultural tourism, vacation experiences, or academic research. These include urban tourists, cultural experiencers, social scholars, literary youth, research teams, and content creators. They are drawn to the fishing village's cultural imagery, lifestyle, and local scenes and use the space primarily for "experiencing, exploring, and learning."These two groups coexist within the same community but have distinct spatial needs and emotional identities, creating a spatial tension between "residents-mobile" and "living-experiencing."

Xiang Fishing Village exhibits typical transitional characteristics and structural tension. On the one hand, it retains a strong marine cultural memory and lifestyle inertia, while on the other, it is undergoing constant transformation driven by tourism and commercialization, influenced by external consumption forces. Within the community, there exists a complex state of intergenerational rupture, functional overlap, cultural pluralism, and differences in belonging. This dynamic poses several challenges for spatial design, particularly in integrating tradition with modernity, balancing local and foreign influences, and reconciling daily life with experiential needs (**Figure 8**).

Figure 8. Local Actor Analysis Map (drawn by Jialin Li)

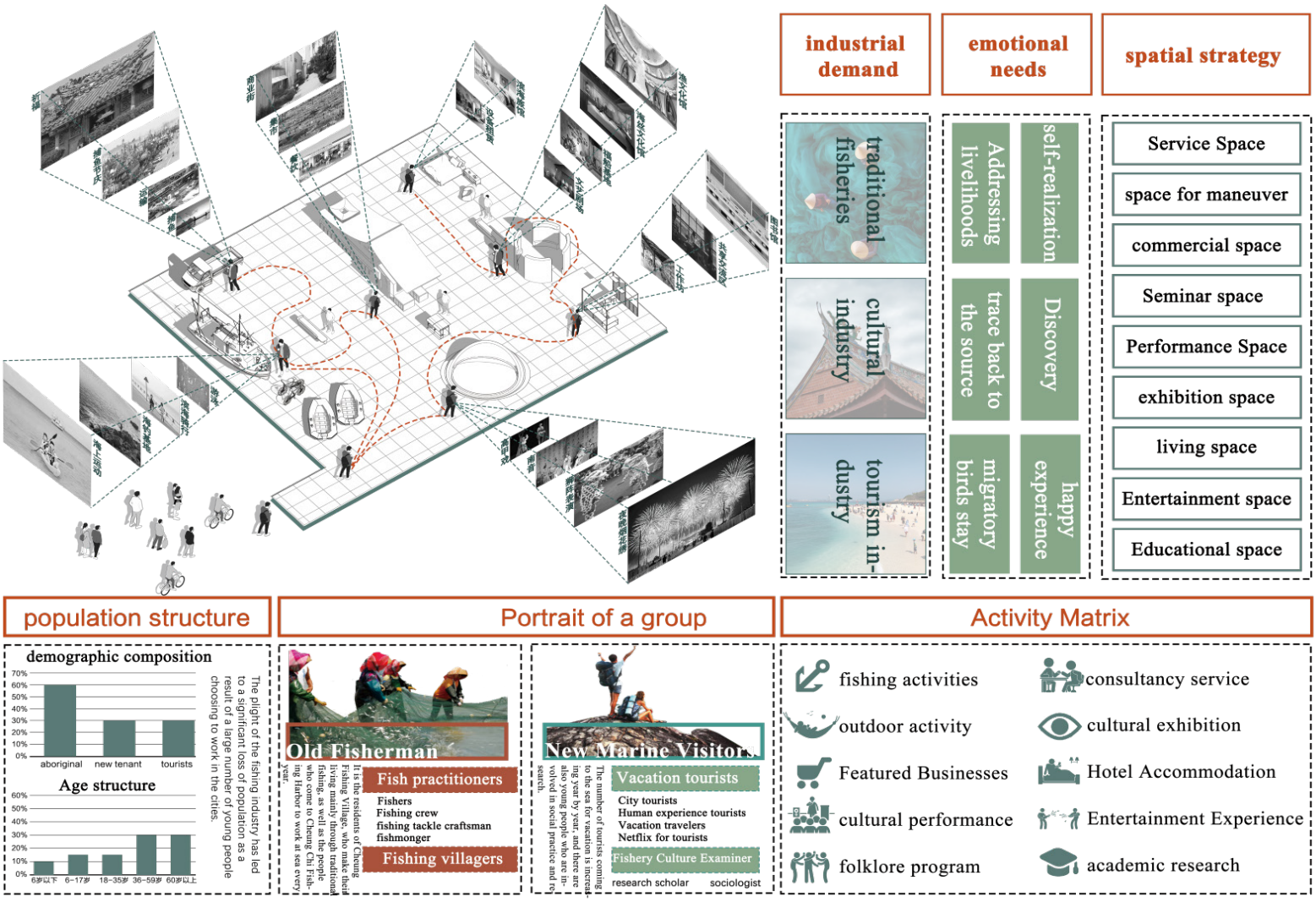


Figure 9. Translating Local Elements into Spatial Design Language (drawn by Jialin Li)

3.2. Synergy of Local Elements and Spatial Carriers: Spatial Translation of Local Values and Place-making

In the process of renewing local space, the relationship between local elements and spatial carriers is not a static correspondence but a dynamic translation mechanism, characterized by continuous evolution and mutual shaping. Local elements, such as cultural traditions, topographical features, and natural resources, form the core of regional identity and uniqueness. Meanwhile, spatial carriers serve the function of visualizing, perceiving, and enacting these intangible values. Spatial design is not merely a container for content, but a crucial medium for activating locality, reshaping collective identities, and fostering connections among social groups.

In terms of design strategy, the realization of the synergy mechanism can be broken down into three stages: first, systematically identifying and analyzing the historical and cultural lineage of the fishing port, as well as the characteristics of the natural environment, to extract cultural elements and environmental factors with spatial translation potential; second, utilizing material, layout, and form to express space in a way that naturally integrates cultural values; and finally, introducing composite usage scenarios through functional restructuring. This approach ensures that the space serves not only a single group but becomes a shared platform linking multiple stakeholders, including residents, tourists, and researchers, thereby supporting the contemporary expression and ongoing practice of local values.

In the spatial practice of Quanzhou Xiangzhi Fishing Harbor, the design deeply responds to the natural pattern of "mountain and sea convergence" and the multiple historical and cultural layers. This response is specifically reflected in the following three aspects (**Figure 9**):

(A) Response to the "Mountain"

The design fully responds to the site's height differences, addressing the spatial relationship between people and the "mountain," while optimizing terrain utilization. In terms of spatial organization, a layered and platform-based layout is adopted, with multiple platforms arranged to match the elevation changes. These platforms are connected through steps and ramps, creating a topographical base that flows smoothly, with distinct height variations and a rhythmic quality. The building units are thoughtfully positioned across different elevations, ensuring that "the roof of the lower house is the courtyard of the upper house," establishing the characteristic vertical settlement form of a mountain town [28]. Regarding spatial morphology, the design emphasizes "building according to the trend," utilizing traditional "mountain grounding strategies" such as staggered floors, varying elevations, and cantilevered sections [29]. This creates a dynamic building cluster, enhancing the visual hierarchy of the space and reinforcing regional identity.

(B) Response to the "Sea"

The design responds closely to the characteristics of the coastal site, addressing the spatial relationship between the fishing harbor and the sea, while establishing ecological connectivity. In terms of spatial organization, the project draws on three typical modes of coastal architecture: near the sea, extending into the sea, and within the sea [30]. Among them, a sea-facing (nearshore) layout strategy is adopted in this project to maximize the

accessibility and visibility of coastal resources. The design creates a progressive coastal spatial sequence, starting from "sea surface–sandy beach–coastal landscape belt–direct coastal building–indirect coastal building–inland" [31]. This spatial progression reinforces the three core design principles: sharing, hydrophilicity, and accessibility [32]. To ensure visual continuity, the distance between the building volumes and the coast is carefully controlled, maintaining the integrity of the city skyline and preserving the transparency of the visual field. In terms of spatial permeability, the openness and interactivity of the space are enhanced through the use of grey space, elevated floors, simple openings, and transparent materials. Furthermore, the visual experience is extended through the organization of sight lines, resulting in a rich layering of "visible" and "sensible" spaces, enriching the overall spatial experience.

(C) Response to Historical and Cultural Accumulation

The design thoroughly explores and translates the local fishing culture, Sea Silk culture, and religious culture to construct a rural cultural landscape characterized by "harmony between the past and the present, between the Chinese and the foreign, and between the inside and the outside." In terms of spatial layout, the design preserves the traditional "Pujing system" and street texture of Southern Fujian, maintaining the religious ritual paths and daily life activity lines to strengthen local spatial memory and cultural perception. For the spatial function layout, the design incorporates a contemporary expression and composite translation of the "fishery culture" industry. It introduces diversified business modules that combine "fishery production + cultural display + ecological experience + public life + tourism service." These modules include a fishery product processing workshop, a Sea Silk culture exhibition hall, an intertidal zone education station, coastal neighborhood bazaars, and special lodging. These spaces create a scene network interwoven with "production, life, and ecology," activating the local industrial system and fostering a sustainable coastal community ecology. Drawing inspiration from the layout logic of "Sham Tseng - Gate Court" of the "Courtyard," the cultural gathering places and activity spaces are embedded in the street system, promoting the fusion of new and old spaces in time, as well as facilitating daily activation. In terms of spatial structure, the use of the arcade and column language of the "Fanzai House" creates continuous interaction spaces with internal and external permeability and flow. This design encourages extended visits, strengthens the place's appeal, and fosters a revitalized relationship between the old fishermen and the new seafarers.

In terms of spatial form, the design integrates architectural languages from both Fan-Zai-Lou and official-style Da-Cuo, incorporating features such as swallowtail ridges, open corridors, dormer windows, and elevated ground floors to reflect local architectural traditions and climatic logic. The building façades emphasize transparency and openness, enhancing visual interaction between residents and visitors, and blurring spatial boundaries to foster public engagement. Multi-level building volumes are connected via rooftop platforms, creating a vertical network of public spaces where "the roof becomes a courtyard." For materials and color, the design employs traditional local elements such as stone, oyster shells, and red bricks, combining them through the brick-in-stone craftsmanship. This generates a localized palette of rouge red, ocean blue, and earthy gray-brown tones, producing a culturally resonant visual texture (**Figure 10**).

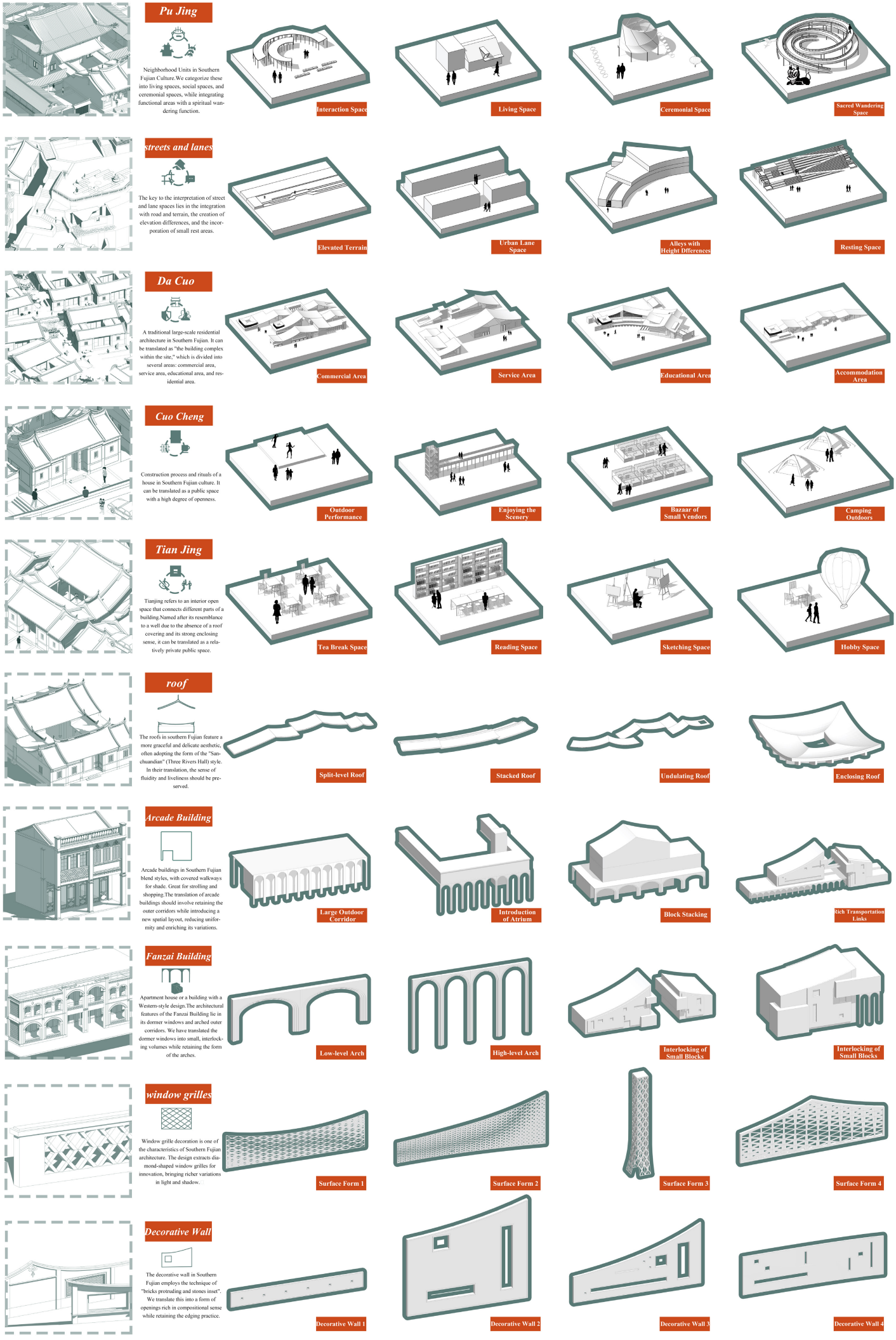


Figure 10. Extraction of Design Elements (drawn by Jialin Li)

The spatial carrier not only translates and visualizes local elements but also shapes the contemporary expression of local values through its use. Originally scattered and static, these local elements are reorganized within the space, enabling residents and tourists to perceive, remember, and engage with them in a daily, scenario-based manner. This process facilitates the organic transformation of "cultural heritage" into a "living space." Ultimately, through the synergistic interaction between local elements and spatial carriers, Xiangzhi Fishing Harbor evolves into a multifaceted coastal community that integrates tourism, dining, living, shopping, entertainment, and research.

3.3. Synergy Between Spatial Carriers and Subjective Actions: Constructing a Symbiotic and Shared Field of Practice

In the process of local spatial transformation, space functions not only as a physical entity that supports functions and forms but also as a behavioral field that stimulates social actions and guides interactive relationships. A dynamic, synergistic mechanism emerges between the spatial carrier and the actions of its users. In this system, spatial design regulates user behavior, while the users' participation and feedback continuously contribute to the adjustment and optimization of space governance and usage. This ongoing interaction ultimately results in a two-way shaping of both space and behavior, creating a behavioral field characterized by "symbiosis and sharing." The mechanism operates on two key support levels:

(A) Behavioral Guidance Mechanism

Spatial design shapes behavioral boundaries and guides interaction patterns through the organization of dynamic pathways, interface configurations, and functional layouts. For instance, traditional productive spaces such as wharves, fishing markets, and fishing workshops are reorganized to enhance their openness and exhibition value. This reorganization not only supports the daily activities of fishermen but also provides tourists with accessible pathways and viewing interfaces. At the same time, it ensures that the various users within these spaces—residents, fishermen, and tourists—do not interfere with one another, maintaining spatial harmony and functionality.

(B) Participatory Coordination Mechanism

The sustainability of a space relies not only on the planning and guidance provided by the designer but also on the continuous participation and co-creation of its users. Within the local context, the expression and consultation rights of various stakeholders, particularly the knowledge and cultural needs of indigenous people, should be safeguarded through institutionalized platforms such as residents' councils and community design workshops. The creation of space is driven by the needs and interests of multiple stakeholders, enabling the realization of truly sustainable, co-constructed environments. In this framework, the space evolves into a platform for negotiation, rather than a mere one-way supply of products.

Taking Xiangzhi Fishing Harbor as a case study, a "fishing village co-construction platform" has been established within the community to encourage the active participation of

fishermen in designing cultural scenarios and developing fishery experience processes. This approach allows their experiential knowledge to become an integral component of the spatial narrative. Building upon this foundation, three traditional fishing practices—production, processing, and craft—are systematically translated into a series of cultural activities, such as boat tours, fishing net making, fish-based cuisine preparation, and fish basket weaving. This integration fosters a seamless connection between function and behavior. Not only does this transformation enhance the space's vitality and appeal, but it also expands the fishermen's sources of income and social roles, effectively articulating the contemporary relevance of traditional livelihoods.

In summary, by guiding behavioral boundaries and fostering synergistic participation, the spatial carrier continuously generates new meanings and social relationships through the interactive practices of multiple subjects. Ultimately, this process culminates in the creation of a multifunctional, shareable, and co-constructive behavioral field (**Figure 11**).

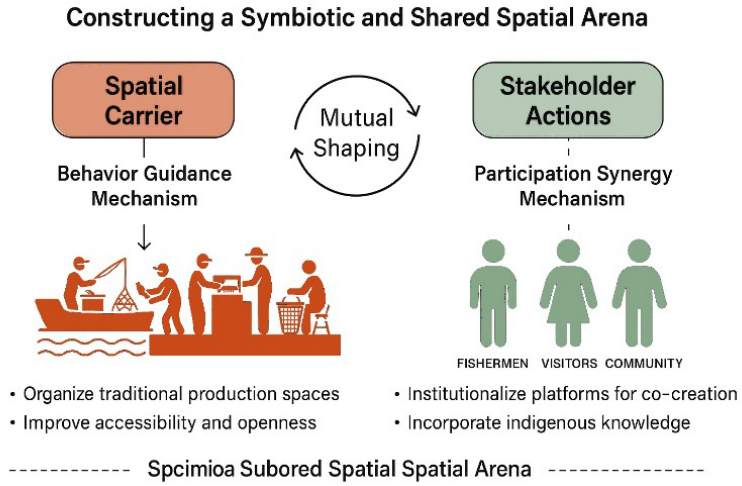


Figure 11. Analysis of the Synergistic Mechanism Between Spatial Carriers and principal Actions (drawn by Yuying Wang)

3.4. Collaboration Between Local Elements and Subject Actions: Constructing an Endogenously Driven Social Energy System

Local elements are not merely static aggregates of culture, resources, and environment, but serve as critical references for individual cognition, judgment, and emotional attachment. Through long-term, practice-based engagement with local modes of production, everyday customs, and cultural memory, individuals construct unique life experiences and value identities.

When spatial form or functional use undergoes transformation, the degree of recognition, willingness to participate, and capacity for action among local actors directly influence the endogenous nature and long-term sustainability of regeneration.

The coordination mechanism is embodied in the reciprocal shaping between local elements and subject actions. On the one hand, the transmission and reinterpretation of local

knowledge can evoke cultural identification and emotional attachment, motivating participation. On the other hand, individuals materialize and spatialize local values through practical action, thereby facilitating the reproduction of knowledge and the evolution of social systems.

In the spatial design practice of Xiangzhi Fishing Harbor, this coordination mechanism unfolds in the following three aspects:

(A) Identity Activation: From Emotional Resonance to Cognitive Internalization

Through collecting oral histories, reinterpreting village chronicles, and compiling historical images, a "memory map" of the Xiangzhi community is reconstructed, reviving cultural genes embedded in fishermen's daily lives as tangible sources of identity. For example, fragmented cultural practices such as the "Mazu temple sea-watching rituals," "fish lantern making processes," and "symbolic carvings on boats" are repositioned as key symbols for reshaping collective cultural awareness. To address local anxieties over cultural "dispossession" amid transformation, the project introduces a "Fishing Village Cultural Cognition Program," establishing local storytelling classes and image-based workshops. These platforms foster knowledge co-creation among elder narrators, returning youth, and designers. Identity activation thus moves beyond emotional belonging, evolving into a form of "knowledge-based identification" grounded in cognitive awareness.

(B) Collaborative Participation: from Individual Experience to Collective Action

The generation of identity requires transformation into action through practice. In the village governance and cultural activities of Xiangzhi, it is suggested that the "Youth Oral History Project" and "Fishing Village Storytelling Camp" are established to encourage diverse groups to engage in the reconstruction of local values in roles such as storytellers, writers, and organizers. Fishermen are not only the recipients of cultural transmission but also become active participants in knowledge co-creation. This collaborative mechanism strengthens internal communication and connections among villagers, bridging generational knowledge gaps, and allowing local culture to regenerate through the process of "co-telling—co-discussing—co-reaching consensus."

(C) Platform Empowerment: from Individual Momentum to Structural Support

The collaborative mechanism should ultimately culminate in a sustainable system of community-driven action. To support this, it is proposed that the Xiangzhi pilot incorporate the establishment of a Traditional Fishing Techniques Workshop, a Community Co-Creation Exhibition Hall, and a Youth Return Incubation Hub. These proposed platforms aim to institutionalize local resource elements and function as catalysts for enhancing individual organizational capacities and community self-governance. For instance, the Xiangzhi Youth Incubation Program may foster local entrepreneurship in cultural innovation, heritage interpretation, and experiential education related to the fishing port. By enabling a locally embedded production–education–community linkage, the mechanism may evolve from short-term intervention toward a sustained model of participatory community governance (**Figure 12**).

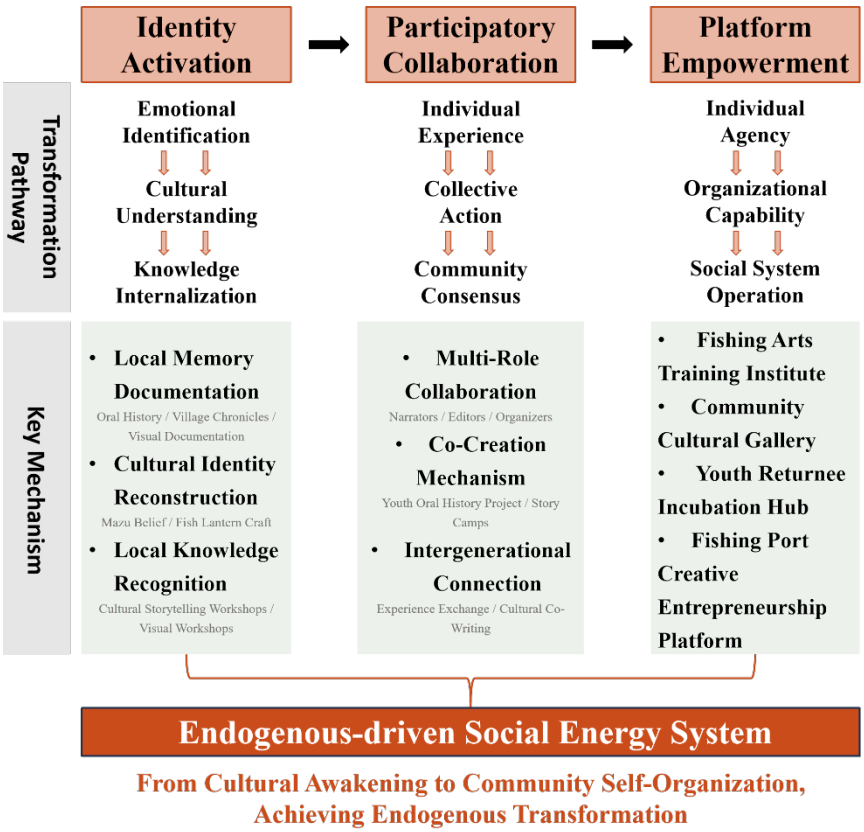


Figure 12. Analysis of the Synergistic Mechanism Between Local Elements and principal Actions (drawn by Yuying Wang)

Discussion and Summary

This study broadens the boundaries of endogenous development theory in spatial practice and responds to the multiple dilemmas faced by traditional fishing villages in transformation. The design process shifts the space of Xiangzhi Fishing Harbor from "passive renewal" to "self-sustaining growth," offering a theoretical framework for local spatial research that is both structurally and developmentally oriented.

Although this study attempts to establish a systematic theoretical and practical framework, several limitations remain. First, the analysis focuses on a single fishing port space, and the representativeness and generalizability of the sample require further validation. Second, the quantitative data supporting the study is limited, and some aspects of the mechanism's construction are primarily based on literature review and case observations, lacking more systematic empirical verification. In addition, the discussion on the complex issues of power dynamics and conflict resolution within the "synergy" mechanism remains underdeveloped, which needs to be supplemented by more interdisciplinary theories, such as sociology and political science, in the future.

Future research can be expanded and deepened in several directions. First, the adaptability and flexibility of the synergistic mechanism model should be tested across different regions and types of spaces through multiple case studies. Second, data-driven methods should be

introduced to quantitatively model the key factors influencing the process of "identity recognition" and "synergistic governance" through surveys, interviews, and behavioral data analysis. Third, practical-level collaboration with communities, design institutions, and local governments should be strengthened to facilitate the transformation of the mechanism model into policy development and spatial planning. This will ensure a genuine transition from theoretical construction to localized implementation.

The traditional fishing village, as a composite space encompassing both ecological and cultural systems, is currently facing a systemic rupture. Grounded in endogenous development theory, this paper addresses the multifaceted challenges of "cultural absence, spatial alienation, and subject incapacity" encountered in the transformation of contemporary fishing villages. It proposes the "endogenous development-driven framework for fishing port transformation," centered around the synergy model of "local elements - spatial carriers - subjective actions." This model, supported by theoretical foundations, mechanism logic, and strategic pathways, forms the core of the proposed framework for local transformation. Through an empirical case study of Xiangzhi Fishing Village in Quanzhou, the paper not only verifies the adaptability and operability of this framework but also highlights the latent potential of traditional fishing harbors in fostering cultural heritage, industrial regeneration, and social synergy.

In contrast to the previously dominant externally driven growth model, the framework proposed in this paper places greater emphasis on integrating local knowledge, spatial participation, and subjective agency. This approach not only enhances the composite functions and public value of the space but also activates the community's intrinsic development potential, all while preserving the cultural memory of the fishing village. This perspective offers a novel paradigm for local spatial governance and a design model for ecologically sensitive and culturally diverse rural areas. As more fishing villages face pressing challenges such as climate change, industrial shifts, and population aging, future research should explore how to extend this framework to various coastal communities, incorporating digital tools and institutional innovations.

Author Contributions:

Yuying Wang was responsible for drafting the initial and revised versions of the manuscript. Jiancai Fan, as the corresponding author, provided overall guidance and critical revisions. Jialin Li contributed to the preparation of the figures.

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Conflicts of Interest:

The authors declare that they have no conflicts of interest related to this research.

Data Collection Description:

The data for this study were collected from both primary and secondary sources to ensure the comprehensiveness and reliability of the research. Primary data were gathered through a field study of Xiangzhi Fishing Village in Quanzhou, Fujian Province. This included on-site observations of the spatial layout and daily activities at the fishing harbor, photographic documentation of the environment and spatial conditions, and semi-structured interviews with fishermen, village officials, tourists, and planning and design professionals. The research focuses on the functional use, cultural practices, community interactions, and local identity within the fishing harbor space, aiming to capture the diverse spatial characteristics and subjective needs of the village during its transformation.

Secondary data were primarily obtained from planning documents, development reports, and statistical records issued by local governments, village and town archives, and relevant research institutions. These sources include fishing port development plans, records of industrial structure shifts, and data on population and land use. In addition, academic literature on endogenous development theory, fishing village transformation, and cultural space governance—both domestic and international—was systematically reviewed to support and complement the construction of the theoretical framework and case analysis.

The whole data collection process follows the principle of combining structuralization and contextualization, focusing on the cross-source of information and the restoration of the actual context. Through the mutual verification and supplementation of empirical evidence and literature, the representativeness and explanatory power of the research results are effectively enhanced, and a solid data foundation is provided for the proposal and testing of the "transformation and development framework of fishing ports driven by endogenous development".

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