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A Study on the Green Economic Development Model and Differentiated Pathways in Meizhou City

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Abstract: The issue of abundant ecological resources coupled with lagging economic development is particularly pronounced in mountainous revolutionary base areas, and differences in county-level development conditions mean that a one-size-fits-all policy cannot meet local needs. Using Meizhou City in Guangdong Province as a case study, this paper draws on local practices such as GEP accounting, forest tenure reform, and the trading of ecological products to propose an analytical framework of "county-level functional classification—development model matching—differentiated pathway design." It categorizes the eight counties (cities and districts) under its jurisdiction into four types: urban, ecological, industrial, and cultural-tourism. The paper identifies three main approaches—ecological industrialization, industrial ecologization, and digital empowerment—and employs a system of city-wide coordination to ensure their implementation. This study finds that the main issues constraining the development of the local green economy include obstacles to the market-based monetization of ecological value, insufficient capacity among market entities to undergo a green transition, and "one-size-fits-all" policies that do not align with the needs of counties. Different implementation plans are proposed for the four categories of counties, with improvements made to municipal-level coordination mechanisms in areas such as digital infrastructure development, institutional reform of production factors, and the financial system for green development. This study can serve as a practical reference for the value transformation of ecological products in similar mountainous revolutionary base areas.

Keywords: Green economy; Realization of ecological product value; County-level heterogeneity; Differentiated development pathways

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1. Introduction

China is comprehensively advancing a green economic and social transition, and relevant policies encourage localities to tap into the economic value of ecological resources through market-based approaches. Through

the “High-Quality Development Project for 100 Counties, 1,000 Towns, and 10,000 Villages” in Guangdong Province, the province has designated the Northern Guangdong region as a barrier for the province’s ecological security and is guiding the orderly transfer of factors such as industry, capital, and technology to Northern Guangdong.

Located at the junction of Guangdong, Fujian, and Jiangxi provinces, Meizhou is a key city in the former Central Soviet Area. Its landscape, characterized by “eight parts mountains, one part water, and one part farmland,” provides Meizhou with a solid foundation for a healthy ecological environment. The city is rich in valuable resources such as camellia oil, southern medicinal herbs, honey pomelos, and geothermal energy. However, the city’s per capita GDP has consistently remained below the national average, highlighting a striking structural contradiction: high ecological value coupled with low economic output. Because the eight counties (cities and districts) under Meizhou’s jurisdiction vary significantly in terms of resource endowments, industrial foundations, and levels of urbanization, a one-size-fits-all policy struggles to meet the diverse development needs of different regions. As a result, some districts and counties have already begun to experience issues such as industrial homogenization and the scattered allocation of resources.

In light of the aforementioned practical challenges, this paper examines how mountainous revolutionary base areas—which vary greatly in their development conditions—can leverage their unique county-level characteristics to select the most appropriate green economic development model and maximize the value of ecological products. It constructs an analytical framework of “county-level functional classification—development model matching—differentiated pathway design,” proposes a suitable combination of development models for mountainous revolutionary base areas, and outlines specific, actionable development pathways for the four types of functional counties in Meizhou.

2. Literature review and problem statement

The concept of the green economy can be traced back to the Blue Book on the Green Economy by Pearce et al. (1989) [1]. Since then, the academic community has continued to explore the conversion of the value of ecological resources, and the existing literature falls into three strands.

First, research on the theoretical foundations of the green economy and ecological value accounting. Pearce et al. (1989) laid the foundation for the concept of a green economy. In recent years, research on ecological value accounting has shifted from theoretical development to policy application. As a natural capital accounting tool adapted to the Chinese context, GEP accounting has been applied in a variety of decision-making scenarios, providing a quantitative basis for evaluating the effectiveness of ecological conservation and for policy formulation [2]. Ingram et al. (2024) point out that natural capital accounting can provide businesses and policymakers with information on nature-related risks and opportunities, thereby improving systemic data [3]; however, there are still various challenges, including difficulties in data collection, insufficient accounting capabilities, and mismatches in spatial and temporal scales. Kurrahman et al. (2024) further developed a data-driven hierarchical model for natural capital accounting, revealing the critical influence of indicators such as water resource accounting, forestry production, and raw material extraction on policy decision-making [4]. However, most of the current accounting frameworks are primarily applicable to regions with a solid data foundation and relatively mature market mechanisms; given the complex ownership structure of collectively owned forest lands and limited fiscal capacity, their

applicability still needs to be further tested.

Second, research on the pathways, models, and micro-level constraints of green industries in mountainous areas. Zhang et al. (2015) identified three development pathways for green industries in mountainous areas—distinctive, circular, and symbiotic—from the perspective of development trajectories [5]; Liu et al. (2020), using the edible mushroom industry as a case study, identified common issues such as lagging industrial modernization and weak innovation capacity in mountainous areas [6]. In terms of development models, Zhang (2021) divides the evolution of the green economy into three stages: end-of-pipe governance, closed-loop resource chains, and super-cycling of the three chains, and has constructed an evolutionary model that expands from the 3Rs to the 5Rs [7]; Yang (2020) proposed a differentiated green development model, in which each region should formulate corresponding green development plans based on its own actual conditions and level of development [8]. Most of the studies mentioned above analyze the issue from the perspective of the region as a whole or the industry as a whole. Ibrahim et al. (2024) argue that payment-for-ecosystem-services programs in smallholder agroforestry systems face challenges such as high implementation costs and significant financial risks [9]; the Asian Development Bank Institute (2025) notes that the green transition of small and medium-sized enterprises is generally hampered by obstacles such as high upfront costs and limited access to financing [10]. Overall, while there are a relatively large number of existing case studies on green industries in mountainous areas, attention to differences among counties within a single municipality remains relatively limited.

Third, practical exploration and institutional innovation in realizing the value of ecological products. In practice, Lishui in Zhejiang, Ji'an in Jiangxi, and Guizhou have experience in localizing GEP accounting, national pilot programs, and digital ecological accounts, respectively; wetland mitigation banks in the United States and ecological accounts in Germany provide international examples. From an institutional perspective, Gao et al. (2025) examined the intrinsic logic of realizing the value of ecological products and pathways for institutional innovation from a macro-management perspective [11]; Zhuang et al. (2024) did so from a political economy perspective [12]; and Xie et al. (2025) did so from a socio-ecological systems perspective [13]. In response to implementation bottlenecks, scholars have identified the "Four Difficulties" and the "Five Difficulties"; in rural areas, contradictions such as an imperfect market transaction system and an imbalance in the distribution of ecological benefits still persist [14–16]. Overall, existing institutional research has primarily focused on regions with general ecological richness, and further discussion is needed regarding the suitability of these approaches for specific regions.

Given the aforementioned research limitations, this paper raises two research questions: First, when the disparities in resource endowments, industrial bases, and urbanization levels among counties within the same city have surpassed regional commonalities, is a unified analytical framework still applicable? Second, how should we establish green development pathways that are tailored to the heterogeneity of counties? To this end, this paper constructs an analytical framework of "county-level functional classification—development model matching—differentiated pathway design." By shifting the focus from the municipal level to the heterogeneous county level, and through the approach of identifying county-level functions, matching development models and tools, and designing implementation pathways, this study explores the localized transformation of the green economy in mountainous revolutionary base areas, thereby providing analytical tools and case references for similar mountainous revolutionary base areas.

3. General characteristics and structural contradictions of green economic development in Meizhou City

As a typical mountainous revolutionary base area, Meizhou City possesses abundant resources for an under-forest economy, specialty agriculture and forestry, and geothermal energy, laying a solid resource foundation for the development of green industries. Since 2010, the development of a green economy in Meizhou City has gradually evolved from scattered pilot projects to a systematic approach. Efforts to protect and restore the ecosystem have been continuously strengthened, and water quality in major river basins remains good; green manufacturing has formed a competitive industrial cluster, and emerging industries such as new energy storage are developing rapidly; in terms of institutional reform, breakthroughs have been achieved in several pilot programs—including GEP accounting, forest tenure reform, ecological product trading, and reverse enclave—and the city has established a preliminary foundation for development in the areas of green economic institutional development and industrial cultivation.

3.1. General characteristics of Meizhou City's green economic development

Taking into account resource endowments, industrial foundations, reform practices, and differences among counties, the green economy in Meizhou City exhibits four general characteristics.

First, while the region has outstanding natural ecological advantages, its level of economic development lags behind. Meizhou has the highest forest coverage rate in Guangdong Province and is rich in ecological and distinctive agricultural and forestry resources, including forest land, understory economy, camellia oil, southern medicinal herbs, and geothermal resources. According to Guangdong Province's GEP accounting standards for forest ecosystems, Meizhou City ranks among the top in the province in terms of total ecological value [17]. However, as a mountainous city located in the former Central Soviet Area, its per capita GDP has long remained below the national average, resulting in a fundamental pattern characterized by "high ecological value but low economic output." Consequently, its ecological advantages have not yet been fully transformed into development advantages.

Second, while green reform pilot projects have achieved breakthroughs in multiple areas, they have not yet formed a unified institutional framework across the city. Pilot programs pioneered at the provincial and national levels—including GEP accounting, forest tenure reform, trading of ecological products for soil and water conservation, reverse enclave, and the construction of green factories—have been implemented, with each reform yielding significant results. However, most of these pilot programs are concentrated in just a few counties and districts; they have not been replicated or scaled up citywide, and there is a lack of integration with financial, property rights, and trading systems.

Third, while green industries are emerging in various areas, the industrial structure exhibits marked regional disparities across counties. Emerging green manufacturing sectors, such as high-end copper foil and new energy storage technologies, have taken root in some districts and counties. The under-forest economy, specialty agriculture and forestry, and hot spring tourism industries have a solid resource foundation; however, there are significant differences in the stages of development among the eight counties (cities and districts). Urban and county-level areas focus on manufacturing and scientific innovation; eco-counties are dominated by agriculture and forestry; industrial counties have a high proportion of traditional industries; and culture and tourism counties have a single-industry structure, resulting in significant heterogeneity in the industrial base within the metropolitan area.

Fourth, while external policy conditions are relatively favorable, the region is subject to significant constraints due to its designation as an ecological function area in northern Guangdong. Policies such as the "Green and Beautiful Guangdong" initiative and the "High-Quality Development Project for 100 Counties, 1,000 Towns, and 10,000 Villages" have created opportunities for Meizhou's green transition. However, as Meizhou serves as Guangdong's ecological security barrier, it is subject to strict ecological regulations; industrial investment and land development are constrained by ecological red lines, limiting the city's options for industrial development.

3.2. Three types of structural contradictions

Meizhou City has already achieved some progress in its development, but there are still many deep-seated contradictions in the local green economy, which are primarily manifested in the following three areas.

First, while the accounting for ecological products has been completed, the channels for converting their value have not yet been established. Collectively owned forest lands are mostly scattered, and the forest land holdings of individual farming households are relatively small. Although pilot programs for the "Red Certificate + Green Certificate" (Meizhou's dual-certificate reform for collective forest-right management) reform have been launched, supporting financial services—such as forest property rights valuation, mortgage registration, and the disposal of non-performing assets—remain underdeveloped, and the barriers to entry for private capital remain high. The GEP accounting in Jiaoling County has achieved preliminary technical results; however, the accounting results have not been effectively integrated with market-based mechanisms such as carbon credit trading, forest rights mortgages, and ecological compensation, and ecological value remains merely a theoretical calculation on paper. At the same time, specialty agricultural products such as Dabu honey pomelos and Pingyuan oil tea are still primarily sold as fresh fruit or raw materials; the proportion of value-added processing remains low, and the influence of regional public brands is limited, preventing them from commanding higher market premiums. Consequently, "difficulty in quantifying, collateralizing, trading, and liquidating" has become a key issue that must be addressed to realize the value of ecological products.

Second, while there is a real need for a green transition, market entities have limited capacity to undertake such a transition. Most of the ceramics and electromechanical enterprises in Xingning and Wuhua are small and medium-sized enterprises. Energy-saving retrofit projects for kilns require significant investment and have a slow return on investment, so these companies are reluctant to undertake such retrofits. The same issue is widespread among small and medium-sized enterprises throughout the city; factors such as small scale, low technical capabilities, and weak risk-bearing capacity have hindered the transition of these small enterprises toward greener operations. At the same time, the supply of funds at the policy level is also limited; the scope of provincial-level special funds for green technological transformation is narrow, making it difficult for a large number of small and micro enterprises to receive substantial financial support.

Third, development conditions vary greatly across counties, making it difficult for a one-size-fits-all policy to fully address local needs. Urban areas (Meijiang District and Meixian District) have a high level of urban development and are home to digital services and green manufacturing industries; however, available land resources are nearing saturation; the eco-oriented regions (Jiaoling County, Pingyuan County, and Dabu County) are rich in forest resources, with agriculture and forestry as their main industries and a relatively weak industrial base; in the industrial regions (Xingning City and Wuhua County), traditional

manufacturing has a substantial scale, and emerging industries are being rapidly established; the culture and tourism model (Fengshun County) boasts unique geothermal hot spring resources and is led by the culture and tourism industry, but the industrial chain has not been fully developed. The four categories of counties are at different stages of development and face significantly different resource constraints and transformation needs. However, municipal-level policies have long been designed to be implemented uniformly across the entire city, which can result in some policies failing to align with local realities when put into practice. Some districts and counties still exhibit homogeneity in their industrial layout, with multiple counties choosing to develop the same sectors—such as the photovoltaic industry and agricultural product processing—resulting in a scattered allocation of resources and a failure to achieve economies of scale.

The three types of contradictions mentioned above are not mutually exclusive; rather, they influence one another, overlap, and accumulate, collectively forming the structural challenges facing the development of a green economy in Meizhou City. The underlying cause lies in the contradiction between the significant differences in actual development conditions across counties and a one-size-fits-all policy model; to resolve this contradiction, it is necessary to formulate countermeasures based on a classification of counties.

4. Analysis of green economic development models in Meizhou City

Ecological industrialization addresses the challenge of transforming "resources into assets and assets into capital," while industrial ecologization tackles the challenge of "reducing carbon emissions and increasing green initiatives in existing industries." Digital empowerment, in turn, enhances the transaction and allocation efficiency of the first two approaches. The combined use of these three main approaches can meet the diverse development needs of the four types of counties in Meizhou City, thereby forming a development pattern that integrates multiple models.

4.1. The ecological industrialization model

Ecological industrialization is based on the theory of ecological product value realization and the theory of resource property rights. Its core concept is to transform natural ecological resources—such as forests, water systems, and geothermal energy—from their original natural state into assets that can be managed and traded, thereby converting the external benefits generated by ecological conservation into economic returns that market entities can obtain.

Meizhou is rich in ecological resources; its forested area and forest coverage rank among the highest in Guangdong Province. The region boasts abundant reserves of distinctive resources such as camellia oil, southern medicinal herbs, honey pomelos, understory agriculture, and geothermal energy. The Jiaoling GEP accounting pilot project and the Pingyuan-Jiaoling "red certificates + green certificates" forest tenure separation reform pilot have provided valuable local experience in the demarcation of ecological asset rights and the assessment of their value.

In the actual implementation process, the ownership and accounting stages must reflect the logic of the "separation of three rights" reform for collectively owned forest land, define the boundaries of rights and obligations among village collectives, farming households, and business entities, and rely on natural capital accounting to clarify the value composition of resources such as forests, wetlands, and water bodies, thereby answering key questions such as "What resources are there? What is their value? And who owns them?" In terms of land transfer and industrial development, the primary focus is on breaking up the

fragmented structure of single-household forest land through the orderly transfer of management rights and the adoption of moderately scaled operations. This approach reduces transaction costs and fosters the development of integrated business models such as under-forest economy, forest wellness, and ecological farming and breeding. It also enables specialty agricultural and forestry products—such as camellia oil, southern medicinal herbs, and honey pomelos—to transition from the export of raw fresh fruits and materials to advanced processing, brand building, and quality traceability. The "Trading and Reinvestment" segment primarily focuses on exploring the trading of ecological rights, such as forestry carbon credits and ecological products related to soil and water conservation. It aims to improve mechanisms for product development, verification of emission reductions, and the integration of trading processes, while allocating a portion of the trading proceeds to ecological conservation, ecological restoration, and public infrastructure projects for village collectives [18]. This creates a virtuous cycle of "ecological conservation—resource appreciation—reinvestment of proceeds—higher levels of conservation," thereby addressing the incentive imbalance where "conservation yields no returns, while destruction incurs no costs."

4.2. Industrial ecologization model

Industrial ecologization refers to the process of applying technological innovation and process reengineering to the existing real economy in a region to achieve low-carbon, circular production throughout the entire production process, thereby reducing the environmental stress caused by industrial activities. The three-stage evolution model of the green economy posits that the transition from end-of-pipe treatment to a closed-loop resource chain and then to a super-cycle of the three chains represents an intrinsic pattern of the gradual deepening of industrial ecologization.

Meizhou's manufacturing sector is characterized by a high proportion of traditional industries and the accelerated development of emerging industries. Xingning Ceramics and Wuhua Electromechanical are home to numerous small and medium-sized manufacturing enterprises. Green technological upgrades require significant upfront investment and have long payback periods, leaving these companies with little incentive to undertake such upgrades on their own. Emerging industries, such as Jiayuan Technology's high-end copper foil and the Wuhua New Energy Storage Industrial Park, have been established one after another; however, the supporting industrial chain remains underdeveloped, and it is still necessary to establish green and low-carbon standards from the very outset of construction. Relying solely on administrative measures to enforce emissions reductions is ineffective; it is essential to establish an incentive and constraint mechanism tailored to the local manufacturing base. This is also the underlying logic behind the implementation of the industrial ecological model in Meizhou.

For traditional industries such as ceramics and electromechanical manufacturing, the focus will be on upgrading and modernizing mature processes—including energy-efficient kiln retrofits, clean energy substitution, reclaimed water reuse, and waste heat recovery—to promote the green transformation of production processes. For emerging manufacturing industries such as energy storage and high-end copper foil, these sectors should be incorporated into the construction standards for circular, zero-carbon industrial parks during the planning phase. At the same time, a dynamic monitoring system for corporate carbon emissions should be established, linking companies' green performance to credit lines and electricity pricing policies, and using market-based mechanisms to create an operational framework that incentivizes low-carbon practices and imposes constraints on high-carbon activities.

4.3. Digital empowerment model

The primary value of digital empowerment lies in addressing the inherent geographical barriers and fragmented departmental data in mountainous regions, reducing market transaction costs, and improving the efficiency of allocating ecological resources and industrial factors [19].

Meizhou is situated in the mountainous region of northern Guangdong. Due to locational constraints, its agricultural and forestry products face difficulties in connecting with external markets. Data from the forestry, ecological environment, and agriculture departments remain isolated from one another, and there is no shared digital foundation for GEP accounting and forest tenure management. The establishment of the "Liwan-Meixian District Reverse Enclave" platform has provided a platform for the digital connection of innovative resources in the Guangdong-Hong Kong-Macao Greater Bay Area. By leveraging digital means to break down information barriers, it is possible to establish communication channels among resources, industries, and markets, providing technical tools for enhancing the quality and efficiency of various green business models.

Digital empowerment can penetrate into every aspect of the development of these four types of functional counties. Ecological county areas can establish a digital management platform for forest rights, develop smart agriculture, agricultural product e-commerce and traceability systems, and enhance the economic benefits of agriculture and forestry industries; industrial county areas can rely on the digital platform for carbon emission monitoring to help promote green technological transformation of enterprises; urban county areas can leverage the reverse enclave area carrier advantages and utilize digital channels to introduce technology and talents from the bay area, and expand digital services and scientific and technological incubation businesses [20]; cultural and tourism county areas can improve the smart guidance system and tourism big data system to alleviate the imbalance between supply and demand in tourism during peak and off-peak seasons [21]; At the municipal level, a green economy big data platform can be established to achieve cross-departmental ecological data interconnection.

4.4. City-wide coordination model

The complete chain for realizing the value of ecological products covers ecological protection, processing production, and final consumption. Each link is located in different counties due to differences in resource endowment. This has led to a situation where spatial dislocation and administrative division are intertwined, preventing the externalities of ecological protection from being self-digested within the county. A single administrative region cannot independently complete the entire process of transforming resources into value. Therefore, a comprehensive coordination mechanism at the municipal level must be established.

Based on the confluence of the Hanjiang and Meijiang rivers, an ecological industrial corridor should be established. In the upper reaches, ecological protection should be carried out; in the middle reaches, green processing industries should be developed; and in the lower reaches, cultural tourism consumption should be promoted. This will form an integrated development pattern across the entire river basin. At the institutional level, a cross-county horizontal ecological compensation system will be implemented. A unified green industry development guidance directory for the entire city will be released to prevent the phenomenon of homogenized competition from the source. In terms of platform construction, a unified ecological product trading platform for the entire city will be established to collect all the information on ecological products in the city. The actual transaction situation of the projects will be connected with the existing ecological

rights trading platform in Guangdong Province, breaking the institutional barriers and information barriers between counties, and providing institutional support and a platform-level foundation for the realization of the aforementioned three main development lines.

The above four types of models are mutually interwoven and coupled in their actual development. Urban-type counties can combine industrial ecological transformation and digital empowerment; ecological-type counties, on the basis of developing ecological industrialization, can also utilize digital technology to upgrade traditional agriculture and forestry industries, and adopt the overall coordination guarantee model for overall supervision. Each county should determine the main development route based on its own functional positioning, flexibly combine other models to form a combined plan, and cannot simply apply a single model template.

5. Differentiated pathways for green economic development in Meizhou

The model system for green economic development in Meizhou is composed of three core development mainlines across the entire region: ecological industrialization, industrial ecologicalization, and digital empowerment. It is also combined with a city-wide coordinated guarantee model. This part, based on the actual development challenges of the four types of functional counties, matches corresponding leading models and supporting measures for each county, converting this model system into implementable and differentiated implementation paths.

5.1. Urban-type counties should deepen the integration of the digital industry and green manufacturing

Meijiang District and Meixian District are the main areas of urbanization and industrial agglomeration in the city. They house leading green manufacturing enterprises and reverse enclave science and technology innovation platforms. However, there is a growing shortage of industrial land and a reduction in urban ecological buffer space. The two districts should follow the principle of industrial ecologicalization as the main line and digital empowerment as the auxiliary, and adopt a smart growth approach. On one hand, they should rely on leading enterprises such as Jiayuan Technology to drive the upgrading of green manufacturing to high-end manufacturing, improve the resource utilization rate and low-carbon output rate of limited land, and carry out intelligent and green renovations of the industrial parks. On the other hand, they should digitally upgrade the reverse enclaves in Liwan and Meixian, improve the incentive policies for project implementation and talent attraction and cultivation, deepen the collaborative mechanism for R&D in the Bay Area and manufacturing in Meizhou, and transform the scientific and technological resources of the Bay Area into local production capacity, solving the problem of green industrial increment landing under land restrictions.

5.2. Eco-oriented counties establish a complete process from GEP accounting to market transactions

The forests in Jiaoling County, Pingyuan County and Dabu County are rich in resources. They have already carried out GEP (Gross Ecosystem Product) accounting and pilot reforms of forest tenure separation. However, the industries are still at the primary stage of agricultural and forestry production, and the ecological assets are difficult to monetize. The three counties focus on ecological industrialization as

the main approach and digital empowerment as a supplementary means. They have fully established the "resource ownership confirmation-value calculation-market transactions-income feedback" chain. They have implemented the "three rights separation" reform for collective forest land and utilized the digital management platform for forest rights to promote the moderate and standardized transfer of forest land. They have carried out intensive processing of characteristic resources such as oil tea, southern medicinal plants, and honey pomelos, established a product traceability system, created a regional public brand, and increased the added value of agricultural and forestry products. They have relied on the results of GEP accounting to establish a reserve library for forestry carbon sink projects, connected with the provincial carbon inclusion mechanism (China's local carbon incentive scheme) and carbon trading markets, explored the incentive mechanism of ecological points linked with credit subsidies, ensured that village collectives and farmers shared ecological benefits, and formed a virtuous cycle of ecological protection and industrial income increase.

5.3. Industrial Counties coordinating the green upgrading of traditional industries with the supportive development of emerging industries

Xingning City and Wuhua County have a solid foundation in traditional manufacturing and have also established a new energy storage industry. However, the green transformation costs for small and medium-sized micro-enterprises are high, and most of the energy storage industries are at the middle and lower assembly stages, with incomplete industrial chain support. The two counties take industrial ecologization as the main line, digital empowerment and city-wide coordination as auxiliary measures, and simultaneously promote the upgrading and transformation of traditional industries as well as the development and cultivation of emerging industries. They have established county-level green technology transformation support funds to establish a diversified investment and financing model of "fiscal subsidy + bank loan + enterprise self-funding," promote technology transformation such as waste heat recovery and clean energy substitution, and reduce the transformation burden of ceramic and mechanical and electrical enterprises; they have built an industrial carbon emission digital monitoring platform and implemented differentiated credit and electricity price policies based on carbon efficiency ratings, and force enterprises to actively reduce carbon emissions; at the same time, for the energy storage industry to extend to upstream key materials such as electrolytes and separators, they jointly build industry-university-research laboratories to break through core technologies, leverage the city-wide coordinated mechanism to provide preferential guarantees for key projects in terms of land and energy consumption indicators, and promote the energy storage industry from single-point layout to cluster development.

5.4. County-level cultural and tourism development: Extending the complete hot spring wellness industry chain

Fengshun County has abundant geothermal hot spring resources, and its hot spring tourism industry is the dominant industry of the county. However, the business model is monotonous, the seasonal fluctuations in tourism are significant, and the linkage effect among the primary, secondary, and tertiary industries is weak. The county takes ecological industrialization as the main line and uses digital empowerment and city-wide coordination as auxiliary means to promote the transformation of hot spring tourism from simple sightseeing to a comprehensive health care economy. Professional health care operation institutions are introduced to develop hot spring health care, traditional Chinese medicine health care and other business models, enriching

diverse consumption scenarios and extending the tourism consumption chain for tourists; digital technology is utilized to explore non-hot spring products such as Hakka intangible heritage, mountain sports and rural study tours to fill the supply gap during the off-season, and the tourism big data platform is utilized for refined passenger flow scheduling; relying on city-wide coordination, together with surrounding ecological counties, cross-regional tourism routes are created to connect the tourism flow with the local agricultural and forestry product sales, and to amplify the radiation and driving effect of the tourism industry on the primary and secondary industries.

5.5. City-wide integrated supporting measures

The implementation of the aforementioned four types of differentiated development paths for county-level regions cannot be done without institutional support at the municipal level. On one hand, the weight of indicators related to green development in the comprehensive performance assessment of county-level regions should be increased, with indicators such as the reduction in unit GDP energy consumption and the improvement of forest quality being regarded as important reference criteria. On the other hand, based on the industrial layout of the "15th Five-Year Plan" of Meizhou City and in combination with the leading functions of each county, differentiated industrial access and guidance policies should be formulated, setting execution standards for land supply, financial support, and investment attraction. To ensure the implementation of these institutional guarantees, supporting measures in three dimensions-basic support, factor activation, and financial guarantee-should be improved to provide comprehensive support for the green transformation and development of county-level regions.

First, strengthen the digital foundation. Build a municipal green economy big data platform, integrate data from various departments including forestry, agriculture, environmental protection, and tourism, and achieve "one map" management of ecological resources. Leverage reverse enclaves to flexibly introduce research forces from the Greater Bay Area, and establish joint research projects focusing on energy storage materials, carbon sink monitoring, and agricultural product deep processing.

Second, deepen the reform of resource elements. Gradually expand the coverage of the forest tenure separation reform, and establish a complete set of property rights system and value assessment system including forest land, water areas and wetlands, providing a foundation for the trading of ecological products.

Thirdly, establish a financial support system that is suitable for the green transformation in mountainous areas. Actively seek to have national and provincial green industry guiding funds set up sub-funds in Meizhou, and provide a small amount of guiding funds at the municipal level to fully mobilize social capital to invest in green projects; encourage financial institutions to innovate ecological financial products, focusing on exploring forest rights mortgage loans, forestry carbon sink project income pledge loans, etc.; plan green and low-carbon projects that comply with Chinese policy requirements, and promote the projects to be included in the Guangdong Province's green special bond project database, and make good use of special bond funds to support green project construction.

6. Conclusions and discussion

This article takes Meizhou City in Guangdong Province as an example to analyze the practical difficulties and solutions encountered in promoting the transformation of ecological product value in mountainous revolutionary base areas. The research reveals that the main contradiction restricting the development of the

green economy in Meizhou City is not the insufficiency of ecological resource endowment or the absence of policies, but the significant differences in resource endowment, industrial foundation, and urbanization level among different counties within the city. A unified policy model is difficult to meet the different development needs of different regions. Therefore, this article constructs an analytical framework of "county function classification-development model matching — differentiated path design." Firstly, it extracts three core development main lines of ecological industrialization, industrial ecologicalization, and digital empowerment, and uses coordinated development of the entire region as the spatial coordination and institutional guarantee mechanism, forming a toolkit for Meizhou's green economic development; then, according to the endowment of resources, leading industries, and urban construction level, the entire city is divided into four functional counties: urban area type, ecological type, industrial type, and cultural tourism type. For the development constraints of different counties, it matches the corresponding core and auxiliary models of the abstract model tool, converting the abstract model tool into a differentiated implementation path that can be implemented on the ground; at the same time, the city-wide integration guarantee mechanism is used to implement the institutional requirements of the coordinated guarantee model, so as to resolve the structural contradictions such as industrial homogenization, difficulty in realizing ecological value, and high cost of industrial transformation caused by "one-size-fits-all" policies.

Based on the existing research, this paper shifts the perspective of green economy research from the provincial and municipal levels to the county level, and forms a complete analytical logic of "county functional classification-development model matching-differentiated path design," which compensates for the shortcomings of existing research that focuses on macro-level discussions and lacks practical implementation in county-level areas. In terms of practice, the research results can provide decision-making references for Meizhou City's ecological industry layout during the "15th Five-Year Plan" period, and can also provide a reference analytical approach for similar mountainous revolutionary base areas in China to carry out the transformation of ecological product value.

However, this study also has certain limitations. Due to the limited availability of public data, this paper mainly adopts qualitative comparison and case analysis methods, and does not construct a quantitative model for quantitative verification. When classifying the functional types of counties, only three factors-resource endowment, industrial type, and urbanization level-were considered, and other influencing factors such as social capital and transportation location were not included. Future research can supplement the field survey questionnaire data of enterprises and farmers, collect panel data over a longer period to analyze the driving factors of green transformation; continuously track the implementation effects of EOD projects and ecological product trading projects, and further improve the green economic development plan for mountainous revolutionary base areas.

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