



How to Establish the Driving Mechanism for the Development of the Hengqin New Area

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Abstract. After studying the course "Principles of Urban and Rural Planning" and delving into the concepts of "Theory of Growth Machines" and "Dynamic Mechanisms," along with conducting an in-depth review of pertinent literature and relevant case studies, this present paper endeavors to comprehend the operative mechanisms of dynamic forces within urban spatial development. Through analytical scrutiny of specific instances, the paper expounds upon certain concrete elements that constitute the dynamic mechanisms. Building upon this foundation, the research further investigates the manifestation of "Dynamic Mechanisms in Urban Spatial Development" within the context of the Hengqin Development Zone in Zhuhai City. In addition, the paper offers insights and recommendations pertaining to its prospective planning and development.

Keywords: Propulsion Mechanism, Spatial Development, Urban Planning, Hengqin New Area

1 Introduction

The Urban development is a complex process shaped by a multitude of interwoven factors, including economic, social, environmental, and cultural influences. Cities, as dynamic centers of human habitation, continuously evolve and adapt to changing eras, driven by the demands and interests of various stakeholders. David Harvey's perspective highlights the interplay between financial capital, land interests, and state influence in propelling urban transformation, forming a cohesive driving force mechanism.

In this context, understanding the constituent elements of this driving force mechanism is essential for comprehending the dynamics of urban spatial evolution. This analysis delves into the various driving forces that shape urban development, such as the physical environment, spatial accessibility, and human needs, emotions, and perceptions. By examining specific examples, this study seeks to unravel the intricate power mechanisms at play within the urban development process^[1].

To illustrate the practical application of these concepts, the case study of Hengqin New Area is examined. Situated in Zhuhai, China, this region's unique combination of strategic location, financial agglomeration, existing resources, and comprehensive cost advantages has propelled its development. However, as Hengqin continues to evolve, it faces complex challenges related to developmental positioning, integration with

neighboring regions, industry selection, and sustainable resource management. By analyzing the components of Hengqin's power mechanism, this study aims to shed light on the opportunities and considerations that will shape its future development.

In essence, this analysis offers a holistic understanding of the driving forces and power mechanisms that steer urban development, using real-world examples to highlight their significance and implications for sustainable growth and transformation^[1].

2 Analysis of the Role and Mechanism of Urban Development Driving Force

As one of the primary forms of human habitation, cities derive their origins, growth, and decline from aggregation. The tangible elements within cities and the forms, styles, and layouts of urban spaces essentially stem from the continuous adaptation of urban structural forms to the demands of changing eras. These materializations are the result of the interwoven effects of human political, economic, social, and cultural activities throughout historical development. The process of urban growth fundamentally involves a spatial game of interests. As emphasized by David Harvey, "Financial capital, land interests, and the state are interlinked into an organic whole, collectively propelling the process of urban transformation and determining various factors of urban space, especially those influencing the structure of class relations and the balance of class forces."

Consistent with David Harvey's viewpoint, urban development requires driving forces, much like any other phenomenon in the world that necessitates propulsion. The various driving forces that foster urban development are not isolated and discrete in their effects; rather, they coalesce to form a driving force mechanism, propelling the course of urban development and urbanization^[2].

But what exactly is a driving force mechanism? It refers to the operational mechanisms of the force system that propels the development of entities, encompassing the processes and modes of interaction among these forces. This concept entails two primary aspects: the mutual interactions among various forces that propel entity development, culminating in the formation of a force system, and the impact of this force system on the entity, propelling its development and transformation, thus constituting the operational mechanism. The dynamics and mechanisms of urban spatial development refer to the operative mechanisms of the dynamic system that propel urban spatial evolution, encompassing the underlying principles, the interplay among various driving forces, and the intricate processes and modes of their interactions.

3 The constituent elements of the power mechanism of urban development and specific examples

Various stakeholders within the realm of power dynamics in urban settings pursue distinct interests, owing to their diverse positional vantage points within the city. In the tapestry of urban spatial development, different constituents assume distinct roles in

shaping the trajectory of urban advancement and the intrinsic arrangement of urban landscapes. In broad terms, the bedrock of this progression emanates from the economic endeavors of enterprises; concurrently, the government, in an indirect capacity, propels spatial development by fostering economic growth, while also wielding a direct influence by formulating policies and orchestrating planning initiatives. Moreover, the environment undertakes a foundational role as a facilitator of spatial development, concurrently exerting a discernible influence on the configuration of spatial patterns. As a final influence, the citizenry yields both propulsive and inhibitory forces upon urban spatial development.

3.1 Realistic physical environment and urban structure

Cities are inherently situated within specific natural geographic settings, imbued with historical legacies, religious significance, and humanistic imprints. The genesis, construction, and evolution of cities are intricately intertwined with their natural surroundings and the resultant urban configurations^[3].

The natural geographic environment serves as the fundamental substrate for the spatial proliferation of cities, exerting direct influence on the trajectory, potential, pace, pattern, and spatial arrangement of urban development. For instance, in regions characterized by expansive plains and gentle topography, urban expanses are relatively unobstructed, fostering the emergence of cities that predominantly evolve in harmonious concentric circles, radiating in a balanced manner across all directions in the form of cohesive blocks. In contrast, mountainous terrains, characterized by intricate river networks, often give rise to cities perched upon elevated peaks, nestled along slender valleys and river corridors, or delineated into clusters by undulating hills and mountains.

3.2 Spatial accessibility

The urban core's pivotal role within its region is primarily facilitated by transportation networks, shaping both its internal dynamics and external connections. The configuration of transport infrastructure significantly dictates the urban spatial development paradigm, acting as the impetus for urban sprawl.

Consider the case of the Yingxia Railway, inaugurated in Fuzhou in 1958. Preceding its inception, Fuzhou's external connectivity relied predominantly on waterborne routes along the Minjiang River. Consequently, the city evolved in tandem with the river's course, progressing longitudinally along its banks. Historically, the Minjiang River's aquatic passage gravitated southwards, propelling the city's expansion correspondingly in that direction. Following the inauguration of the Yingxia Railway, the urban expanse underwent a northward shift, prompted by the location of Fuzhou Railway Station outside the city, along the Fuxia Expressway. The culmination of the coastal railroad and Fuzhou Outer Harbor necessitated the eastward and southward expansion of Fuzhou's urban fabric, bridging the Min River^[4].

The accessibility of transportation invariably becomes the principal axis along which urban spatial development extends, wielding a directional influence on urban growth.

Furthermore, it renders conceivable the transition from centralization to decentralization and from downtown concentration to suburban diffusion, thereby affording citizens equitable access to employment opportunities and communal amenities.

3.3 Human Life needs, emotions, and perceptions

Labor-management relations, community interactions across socioeconomic classes, and individuals' sense of belonging collectively constitute the primary impetus driving the evolution of urban spatial structures. As cities undergo economic development, accompanied by increased resident incomes and enhanced social conditions, the exigencies of citizen living escalate significantly. In numerous urban areas, the central city environment's deterioration prompts citizens belonging to higher socioeconomic strata to relocate to suburban locales. This outmigration of urban residents is paralleled by the shifting of certain industries and essential resident services to suburban regions, thereby instigating the outward expansion of the urban domain.

Consider Shenzhen City as an illustrative case. In the initial stages following the establishment of the Shenzhen Special Administrative Region (SAR), the SAR's 327.5 square kilometers accommodated merely a few hundred thousand inhabitants. To allure Hong Kong investments, the urban core was erected in Luohu, configuring an urban spatial pattern known as the "three points and one line," encompassing two additional strongholds, Shekou and Shatoujiao^[5]. Gradually, the SAR's built-up expanse expanded in tandem with population growth, culminating in a belt-like multi-center cluster configuration. As the central region's development approached saturation and residents' living pressures surged, a propensity for decentralization emerged, prompting inhabitants and labor-intensive industries to gravitate away from the city center. Capitalizing on this shift, Bao'an County experienced robust development, marking Shenzhen City's entry into a comprehensive developmental phase.

The inherent attributes of urban spatial progression progressively take form through the realization of urban functions, thereby guiding the migratory dynamics of distinct population cohorts stratified by quality and consumption behaviors. This type of urban spatial evolution, driven by the aspirations, sentiments, and perceptions of urban residents for an elevated quality of life, distinguishes itself from the first two factors by its lack of overt regularity. Instead, it exerts a distinct influence on urban space expansion, as well as the utilization and apportionment of urban land resources.

4 Establishing a Power Mechanism Framework for Hengqin New Area's Development

4.1 Overview of Hengqin New Area's Development Status

In Hengqin New Area is situated on Hengqin Island in the southern part of Zhuhai City, Guangdong Province. It occupies a strategic location, nestled to the west of the Pearl River mouth, south of the South China Sea, and in proximity to Hong Kong and Macao. This region, which encompasses the largest island in Zhuhai City, serves as a pivotal

hub in Southeast Asia and a thriving economic epicenter in China. Spanning approximately 8.6 kilometers north to south and 7 kilometers east to west, Hengqin Island experiences a southern subtropical monsoon climate, with an average yearly temperature ranging between 22°C and 23°C. Blessed with scenic coastlines and water bodies, the area boasts three vital ecosystems: marine, forest, and wetlands.

A noteworthy facet of Zhuhai is the Hengqin Free Trade Zone (FTZ). As one of the three major FTZs in the Greater Bay Area, the Hengqin FTZ stands as a vital collaboration zone that interfaces with Hong Kong and Macao^[6]. With its distinctive blend of policies and investments from these territories and other parts of China, Hengqin FTZ holds a unique position. The total area spans 106.46 square kilometers, with a developable area of 33 square kilometers. This expanse hosts over 60,000 enterprises, including 45 Fortune 500 companies and 73 domestically ranked Fortune 500 entities that have chosen to set up shop here. In 2018 alone, 22,000 new enterprises were established, with a daily influx of over 60 newcomers.

Functioning as an exemplar of urban development and an innovative mechanism for regional cooperation in the Pearl River Delta (PRD), Hengqin serves a dual role. Not only does it bear the vital task of transforming urban development in the PRD, but it also serves as a growth nucleus for revitalizing the PRD's western coastline. Thus, a careful analysis of the influential elements within its power mechanism becomes pivotal, leading to a comprehensive understanding of the opportunities and trajectories that lie ahead for Hengqin's future planning. This approach aims to chart a developmental path that optimally leverages its strengths and values.

4.2 Components of the Power Mechanism Steering Hengqin New Area's Development

Strategic Location and Transportation Advantages

Hengqin New Area capitalizes on its strategic intersection point between "one country, two systems," bearing a rich history of economic, trade, and cultural collaboration with Hong Kong and Macao. Its geographic proximity is impressive, lying just 34 kilometers away from Hong Kong, a mere 3 kilometers from Macao Airport, and approximately 8 kilometers from Zhuhai Airport. A bridge connecting Hengqin New Area to Macao spans less than 200 meters at its closest point. Ongoing transport projects such as the Hong Kong-Zhuhai-Macao Bridge, Guangzhou-Zhuhai Intercity Railway Extension, Tai-Macao Expressway, Beijing-Hong Kong-Macao Expressway, Jinhai Bridge, and Hengqin Second Bridge ensure direct connectivity throughout China, as well as direct links to Hong Kong and Macao^[7].

With Macau, Zhuhai, and Hong Kong airports all within a half-hour drive and five significant international and domestic airports—including Guangzhou and Shenzhen—reachable within two hours, Hengqin's accessibility stands as a powerful asset. Once the Hong Kong-Zhuhai-Macao Bridge opened in 2016, travel time between Hong Kong and Hengqin was slashed to a mere half-hour. Positioned at the heart of Southeast Asia's vibrant economic sphere, Hengqin Island is easily accessible within a four-hour flight from major cities across Southeast Asia, amplifying its competitive location advantage.

These enhanced transport connections drive shifts in Hengqin's land use pattern. As major roadways and bridges beckon, the urban core draws closer to the main thoroughfares. Consequently, industrial and commercial enterprises flourish along these arteries, inevitably reshaping land functions in the urban sector. This transformation impacts the overall land use layout in Hengqin, redefining its economic center by strategically influencing key areas through the planning and construction of pivotal transportation routes.

Hengqin's heightened spatial accessibility concurrently accelerates the flow of people and goods within the city. A robust transportation infrastructure not only streamlines external connections but also expedites capital movement, thus perpetuating efficient economic growth.

Furthermore, the symbiotic development of Hengqin New Area and its neighboring regions is closely intertwined with this elevated accessibility. Urban and regional development are inherently interdependent, intricately woven into the fabric of neighboring and wider areas. Transportation acts as the conduit linking socio-economic activities across geographic spaces, dictating the extent and scope of spatial interactions. Improved accessibility for Hengqin fosters harmonious, mutually influential, and swift growth across the broader Guangdong, Hong Kong, and Macao region.

Advantages of Financial Agglomeration

Since the establishment of the Hengqin New Area, robust support from national, provincial, and municipal authorities, along with capital inflow, has provided significant development opportunities. Financial institutions have swiftly relocated, demonstrating a clear focus on financial innovation. This has led to a burgeoning financial industry, characterized by the following key points:

- Financial institutions have rapidly diversified their presence.
- Collaborative financial cooperation involving Guangdong, Hong Kong, and Macao is yielding positive outcomes within Hengqin.
- The operationalization of the Hengqin Financial Industry Service Base and the solicitation of various financial projects have initiated a nascent pattern of financial investment aggregation.
- Continuous streams of institutions are engaging in discussions and negotiations concerning the establishment of financial entities and fostering financial business innovation in Hengqin.

The influx of capital and the concentration of the financial industry within the Hengqin New Area have spurred both economic growth and financial influence^[4]. These factors synergistically contribute to shaping the development of the regional financial industry and related sectors. Consequently, there has been rapid economic expansion within Hengqin's core region and its proximate Guangdong, Hong Kong, and Macao locales. This growth has enhanced living standards and increased governmental financial revenues.

Advantages of Existing Resources and Environment

Hengqin is endowed with three well-preserved ecosystems: marine, forest, and wetland. These ecosystems are encompassed by water bodies, boasting picturesque coastlines and lush vegetation along the island's 50-kilometer-long perimeter. The island's captivating landscape includes expansive reed swamps, thriving mangrove forests, and post-rain waterfalls. Scenic rock formations further adorn the area, collectively furnishing a favorable backdrop for tourism industry development.

Spanning a total land area of 106.46 square kilometers, Hengqin's vast expanse includes over 90% of undeveloped land, making it the last remaining "virgin land" within the core of the Pearl River Delta. Additionally, government approval has been secured for the reclamation of 27.9 square kilometers in the island's southern segment, ensuring land availability for future development. Hengqin New Area adheres to international standards in its planning and design. A considerable investment of 12.6 billion yuan has facilitated the creation of comprehensive municipal infrastructures, highlighted by the innovative 34-kilometer-long "common pipe trench." This unique pipeline network centralizes water supply, sewage disposal, communications, cables, heat supply, natural gas, and garbage vacuum systems within a 3.2-meter-high conduit^[4]. Such an advancement, unmatched in China and rare globally, establishes a robust foundation for Hengqin's high-standard, large-scale development.

Comprehensive Cost Advantages

With 15 universities and colleges, Zhuhai annually produces over 25,000 university graduates, thus providing an abundant source of local, cost-effective talent for Hengqin New Area. The presence of numerous high-tech enterprises in Zhuhai furnishes invaluable technical support to Hengqin's ventures. Moreover, Hengqin benefits from low logistics, utility, communication, and real estate costs. Its cost of living, pricing, housing rates, medical expenses, and education costs all remain lower than those in first-tier national cities, Hong Kong, and Macao. These favorable conditions collectively establish Hengqin as an attractive, liveable, and conducive city for both work and residence.

4.3 Prospective Considerations for the Future Development of Hengqin New Area

The continued development of Hengqin New Area presents a series of intricacies that warrant careful contemplation. These include unresolved concerns surrounding its developmental positioning, the imperative to seamlessly integrate and facilitate the advancement of Hong Kong and Macao, optimal industries suited for Hengqin's unique strengths, the imperative to rectify prevailing economic deficits, the intricacies of land tenure and the attendant challenges of urban construction and administration. Confronted by these multifaceted issues, it is prudent to devise strategic interventions across the following domains^[3]:

Primarily, a reevaluation of the regional development's fundamental positioning is exigent. In pursuit of international integration and alignment with Hong Kong and Macao, Hengqin New Area ought to conscientiously calibrate its convergence with an eye

to its inherent adaptive capacities and judicious selection of alignment vectors. While imbibing and assimilating cutting-edge technologies, a cogent strategy to mitigate undesired global repercussions and address certain developmental insufficiencies observable in Hong Kong and Macao should be devised. The propulsion of proximate regional progress must also be cautiously undertaken to forestall the escalation of income disparities, regional differentials, and attendant sociopolitical contentions.

Secondarily, harnessing the cardinal potential of industry and demography is paramount. Anchoring the development blueprint on the bedrock of industry leadership, Hengqin should cultivate sectors that resonate harmoniously with its geographic, economic, and demographic context. A meticulous appraisal of industry and demographic requisites should inform a refined quality of life enhancement, thus exuding magnetic allure for a higher echelon of the resident populace^[5].

Lastly, judicious exploitation of Hengqin's endowments, encompassing its topographical features, coastline expanse, watercourses, and pristine ecosystems, presents an avenue to heighten the core competitiveness of Zhuhai and its environs. A methodical assessment of the latent developmental potency of the terrain should be conducted. Further, the prudent apportionment of land parcels, strategically preserved for future valorization, underscores a sagacious approach to sustained land value appreciation.

5 Conclusion

In the course of urban development, municipalities adhere to their individual requisites and pursue the optimization of their self-interests. Urban planning functions as a regulatory instrument that embodies the collective interests of the city, orchestrating judicious arrangements for spatial layout. Confronted with the historical mandate entrusted to Hengqin, the imperative of advancing in a more optimal and expedient manner to emerge as an exemplar of regional urban, economic, and social progress necessitates our careful consideration.

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