



IACP国际中国规划协会第四届国际研讨会

Spatial Coupling of the Urban Master Planning and Main Functional Area planning 城市总体规划区划与主体功能区划的空间耦合研究

- Tsinghua University清华大学建筑学院
- HanQing GuChaolin
- 韩青 顾朝林
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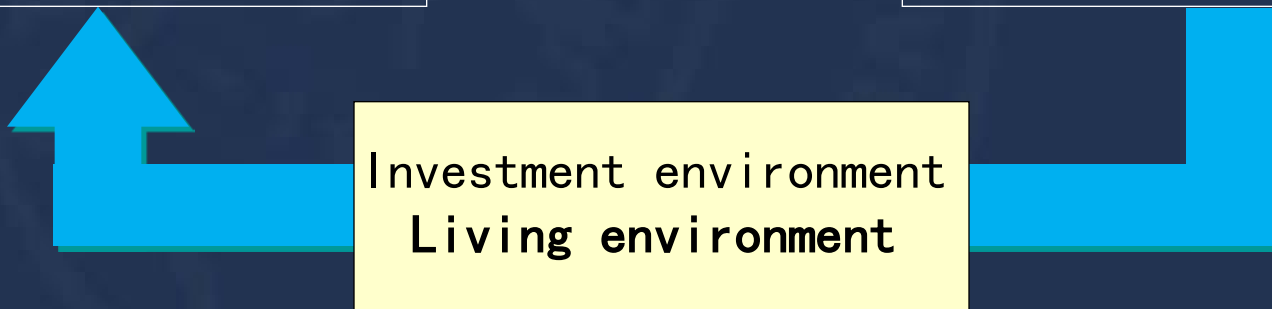
Introduction

During these 30 years of reform and opening up, China experienced rapid economic growth which promoted urban and regional development, but also produced problems of uncoordinated region development.



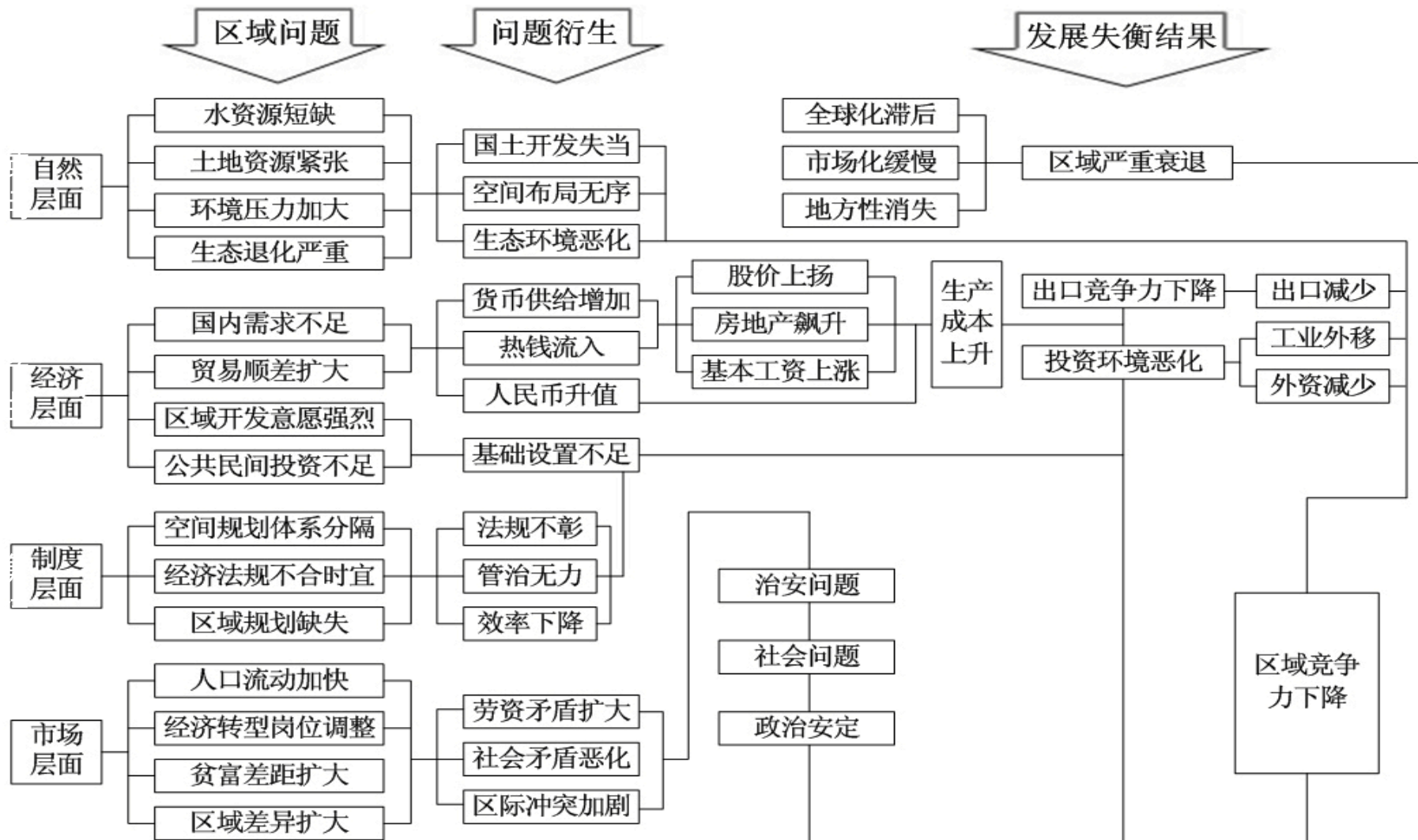
These problems include not only the economic disparity between regions, but also the spatial imbalance of population, economy and the environment. (Makai, 2006).

Investment environment
Living environment





Introduction





Introduction

Faced with an increasingly urgent problem of regional coordination, several departments such as Ministry of Land, National Development and Reform Commission, Ministry of Housing and Urban and Rural Development, the Ministry of Environmental Protection, organized respectively the formation of a system of spatial planning including main functional area planning, urban master planning and eco-planning.

main functional area planning

National
Development and
Reform Commission

urban master planning

Ministry of
Housing and
Urban
Developmen

eco-planning

Ministry of
Environmental
Protection





Introduction

Spatial planning became a system of constraints and norms for all kinds of resource uses, and different spatial planning undertaken with two major tasks that include quotas for spatial extent.

Planning also became the basis and standards for identification of various regions of space. However, the controlling of different indicators of spatial planning has not been coordinated, and to expand the scope of its interests, the different types of spatial planning began to develop plan content, with various conflicts and contradictions in space.

Among them, the conflict between space control planning division of the urban master planning and the main function area planning is the most prominent.





Introduction

Currently, as it is still early in the implementation of spatial controls in urban master planning, the tools for spatial control are largely centered on general principles, not on practical application.

“Main functional area planning” is based on the capacity of resources and the environment, existing development density, and development potential, and it regulates spatial development.

Spatial control is the main objective, but actually, there are conflicts between the “**block function**” and “**space boundary**” and it might lead to development conflicts.

Therefore, space planning at the municipal level domain coupling between the master planning of urban space control district and the main functional area is particularly pressing.





1. Systemic Problems of Spatial Boundaries

空间界限系统性问题探讨

- Spatial boundaries of the land involved in the cognitive space of basic natural properties, but also social values. From the starting point of view, the main functional areas is “governance” of the national spatial planning , based on the basic principles of configuration elements, urban and rural planning is a target of function.
- Although they identified a strong spatial function is reasonable, the governance of space limit is clear. However, the implementation of specific land space, there is a difference between macro and micro, there is the lack of space limits the middle level.





1. Systemic Problems of Spatial Boundaries

空间界限系统性问题探讨

1.1 The macro-definitions
of main functional area
space boundaries
主体功能区空间界限
宏观界定

1.2 Micro- defined of the
urban area space boundaries
城市规划区空间界限微观界定

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1.4 City level domain to
establish P-C-L-E coupling
space model

1.3 Urban and regional planning
the system complementary of
space limit 空间界限互补性分析

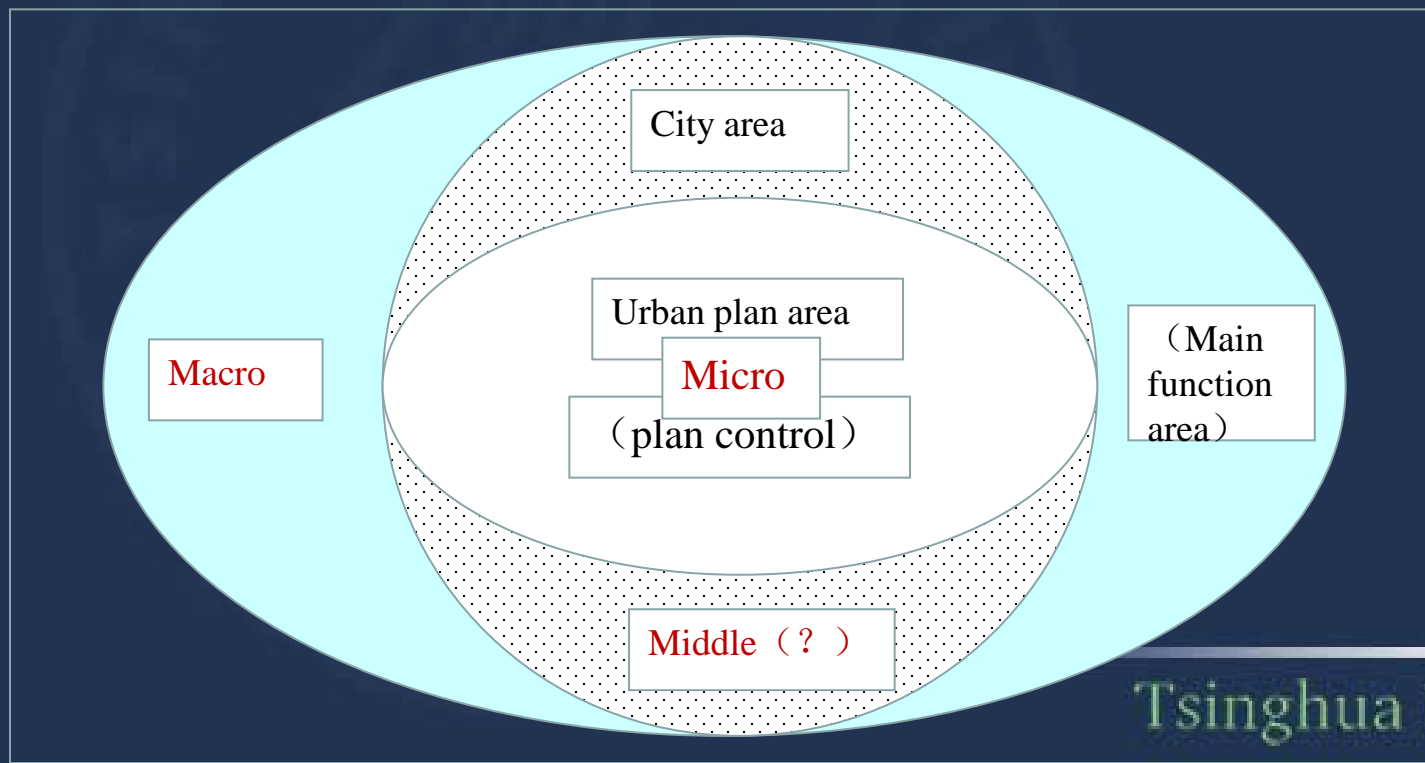




1. Systemic Problems of Spatial Boundaries

空间界限系统性问题探讨

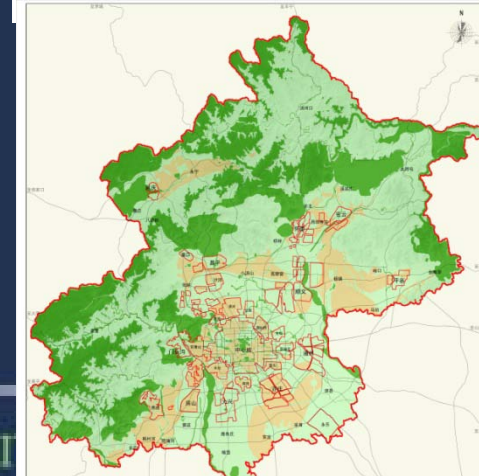
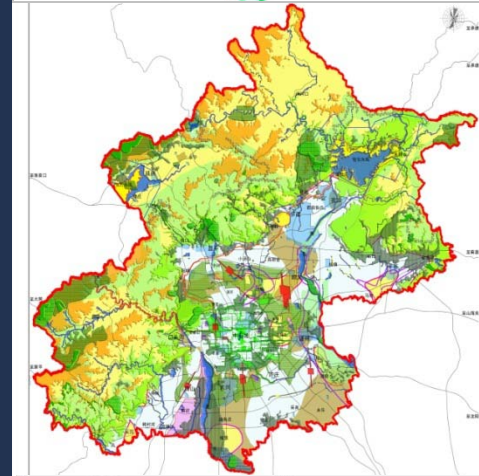
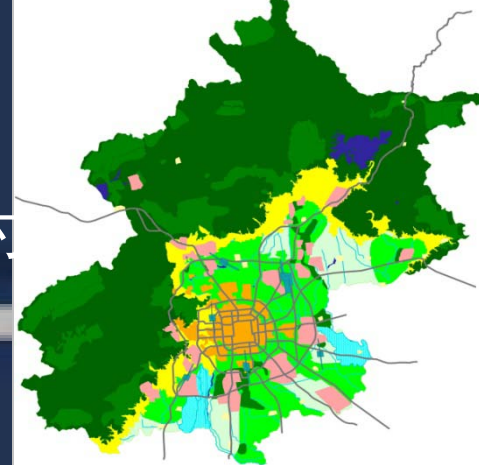
- 1.1 The macro-definitions of main functional area space boundaries
- At present the main features of the provisions of main functional area planning are that plans are prepared at the national and provincial level, municipalities and counties will no longer prepare main functional area plans and the main focus of research on main functional area planning is on the national and provincial level.





1. Systemic Problems of Spatial Boundaries 空间界限系统性问题探讨

- 1.1 The macro-definitions of main functional area space boundaries 主体功能区空间界限宏观界定
- However, there are some cities and counties that have also explored the use of main functional areas, such as Beijing's Eleventh Five-Year Plan, which employs a pattern of "type area" + "ribbon". Before conducting the main function zoning, Beijing has four new functional areas: the core area of the capital city, urban functional development areas, urban development and ecological conservation development area in the spatial domain, these four functional areas are simply four categories of land use. Its main function is the functional division within the framework of zoning, according to such differences within the region of the regional resources and environmental carrying capacity, development density and development potential of (Du Liming, 2007).





1. Systemic Problems of Spatial Boundaries

- 1.1 The macro-definitions of main functional area space boundaries
- 主体功能区空间界限宏观界定
- Zhu Chuangeng (2007) says that if too many levels of government all undertake main functional area planning and all specify functional areas optimal development zones, key development zones, etc., this will inevitably lead to the weakening of the regulatory function of the geographic region and its main functional areas, leading to a return to uncoordinated development lead by individual jurisdictions.
- Therefore, city and county governments should not divide their land into main functional areas, but undertake regular functional zoning, according to the main functional areas of national and provincial functions of local position, combined with the geographical characteristics of cities and counties, cities and counties geographical space on the further functional area and position, a clear the red line is geographical division in specific types of functional areas





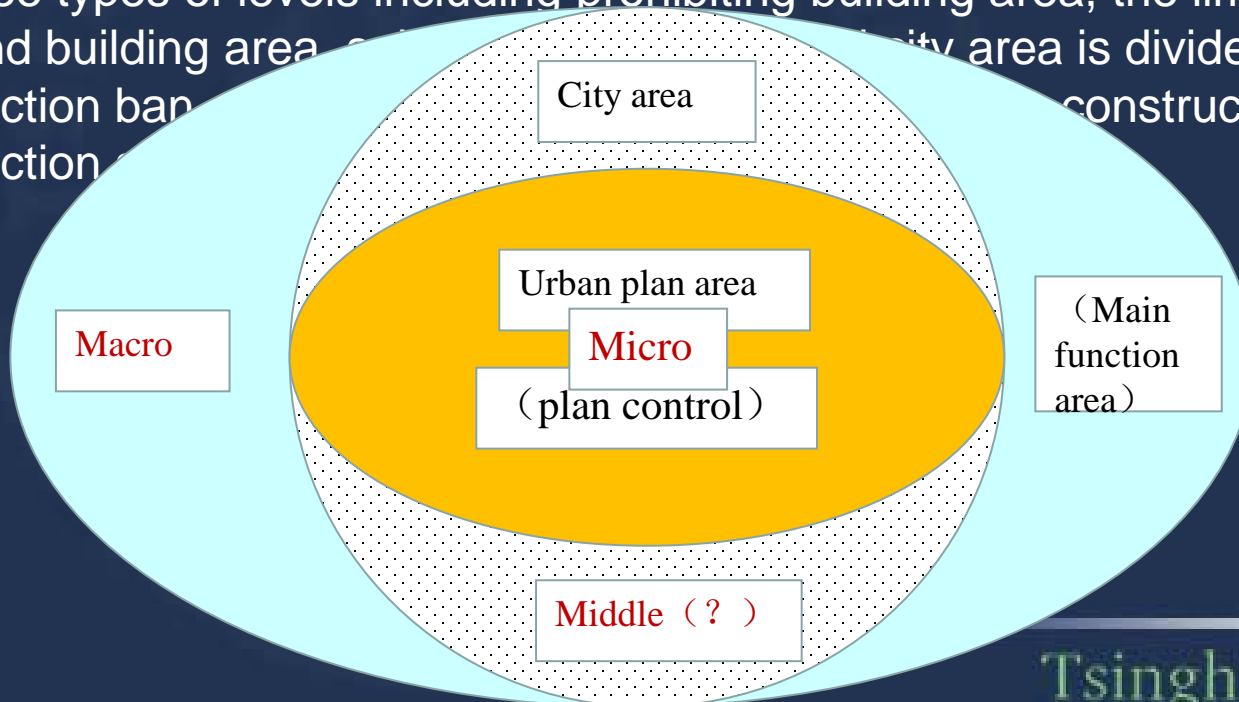
1. Systemic Problems of Spatial Boundaries

- 1.2 Micro- defined of the urban area space boundaries
- 城市总体规划空间界限微观界定
- The earliest concept of urban planning area is defined in the 1990 version “The Town Planning Act”: city planning area is the area need to control in the city urban, suburban and urban administrative area for urban construction and development, meaning that in the central city delineated the scope of urban planning area. In the 2006 version “planning measures” the scope is enlarged: urban system planning in urban planning area designated.
- In the 2008 “Town and Country Planning Act” the second article: Planning areas are cities, towns and villages into urban and rural areas and for construction and development needs, the regional planning control to be implemented; the 42nd article: rural and urban planning departments shall beyond the scope of construction land determined to planning permission. That is, urban and rural planning is not all the land area covered by the urban planning, as required in four districts in the planning area should be ok, we can see that the concept of urban planning area boundaries are micro-level of the urban master planning.



1. Systemic Problems of Spatial Boundaries

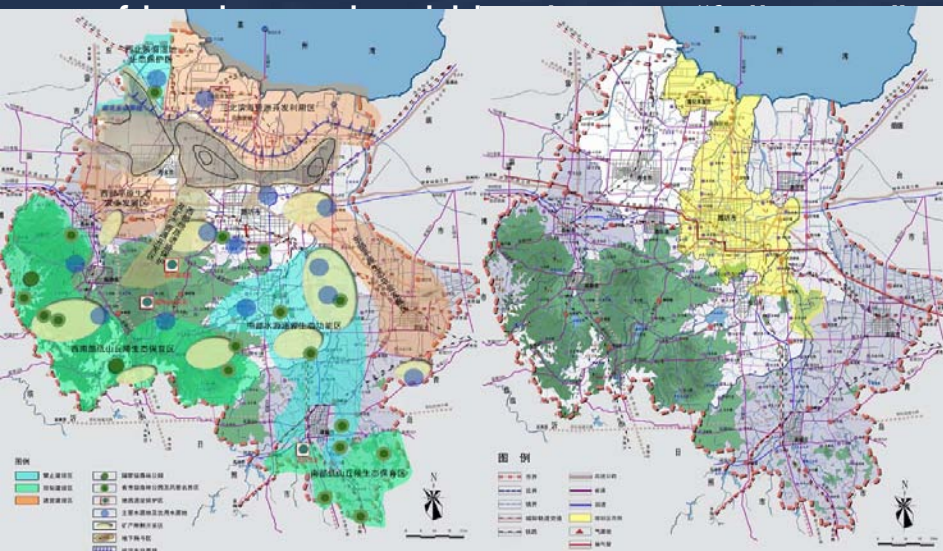
- 1.2 Micro- defined of the urban area space boundaries
- 城市总体规划空间界限微观界定
- Because the preparation method did not make demands on the city level domain, so around the time the implementation are quite different, there is also progress in different state. Some experts recommend in the municipal area level is divided into three types of levels including prohibiting building area, the limit construction area and building area. In the city area is divided into the construction ban area, the limit construction area and building area.





1. Systemic Problems of Spatial Boundaries

- 1.2 Micro- defined of the urban area space boundaries
- 城市总体规划空间界限微观界定
- Also in the urban planning in different levels between the city planning area as the city in the middle of planning and urban planning level, such as Yantai, Shandong Province, in the planning area: division was prohibited area, restricted building area, suitable for the construction area and built areas, provide the basis for the layout land for construction, agricultural land, ecological sites and other land for urban construction and towns, rural settlements (Pei Junsheng, 2007); the Weifang City master plan is also carried out in urban planning area special planning. Some scholars said that the urban planning area

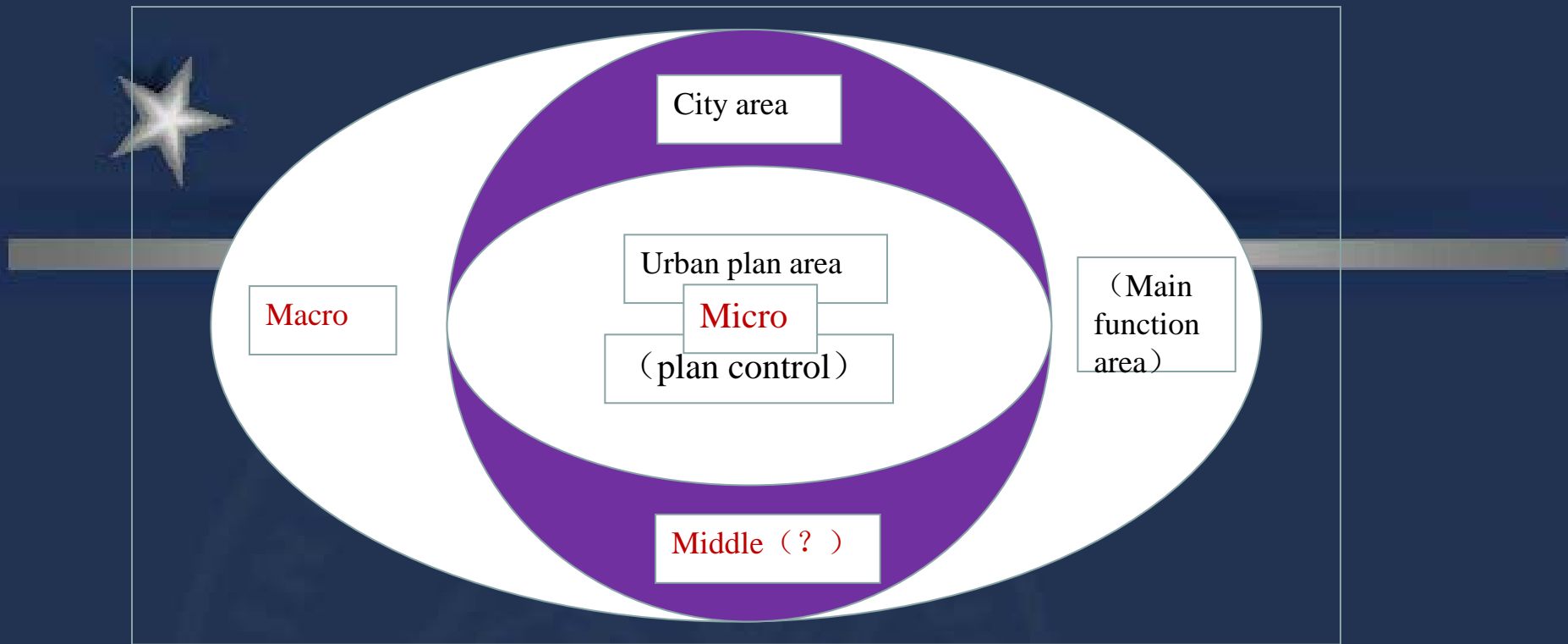




1. Systemic Problems of Spatial Boundaries

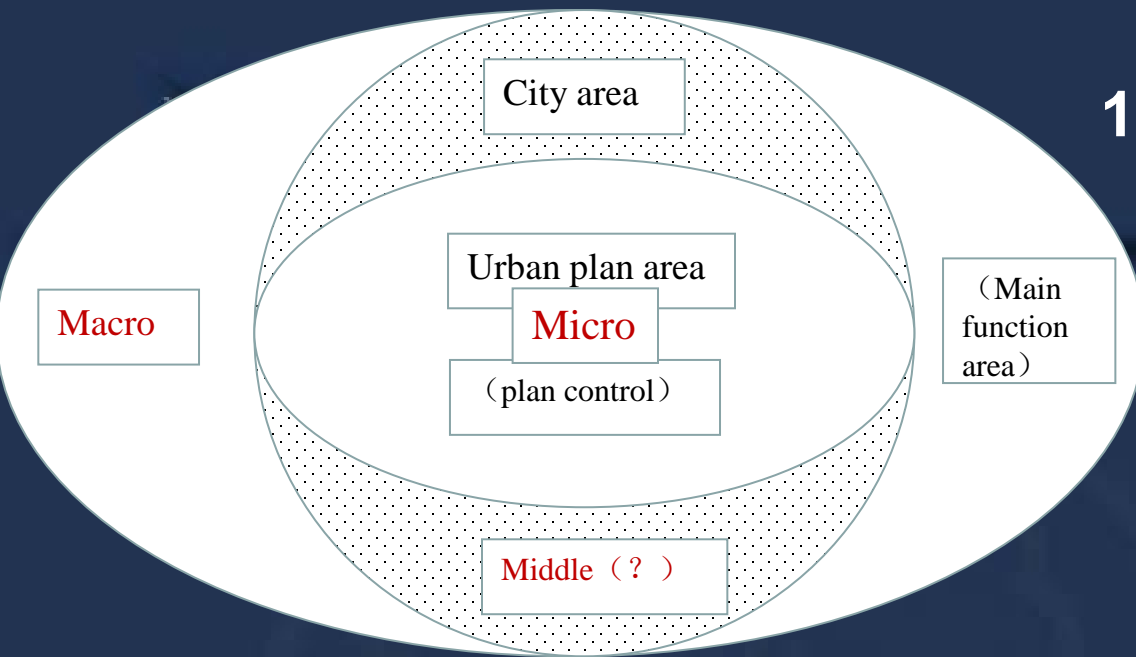
- 1.3 Urban and regional planning the system complementary of space limits
- The main functional areas are related to county as a unit, describes the main body of the leading regional development functions; and control division of the spatial scales of space and more subtle development activities, the main effect is that through the implementation of governance and classification of space control, space development activities on the development of regional restrictions, constraints or guidance, to promote harmonious development between man and nature, regulate and optimize the space development order (Hao Chunyan, 2008).
- Currently the two departments are the National Development and Reform Commission and Ministry of Construction, planning their own role in the play in the field related to each other, has not been formed between the convergence of technology shows that the path does not match the design and institutional arrangements. Some experts say this: the existing institutional framework does not need to be first broken by differences in location and co-ordination acquired sublimation framework (Wang Jingbo, 2008).



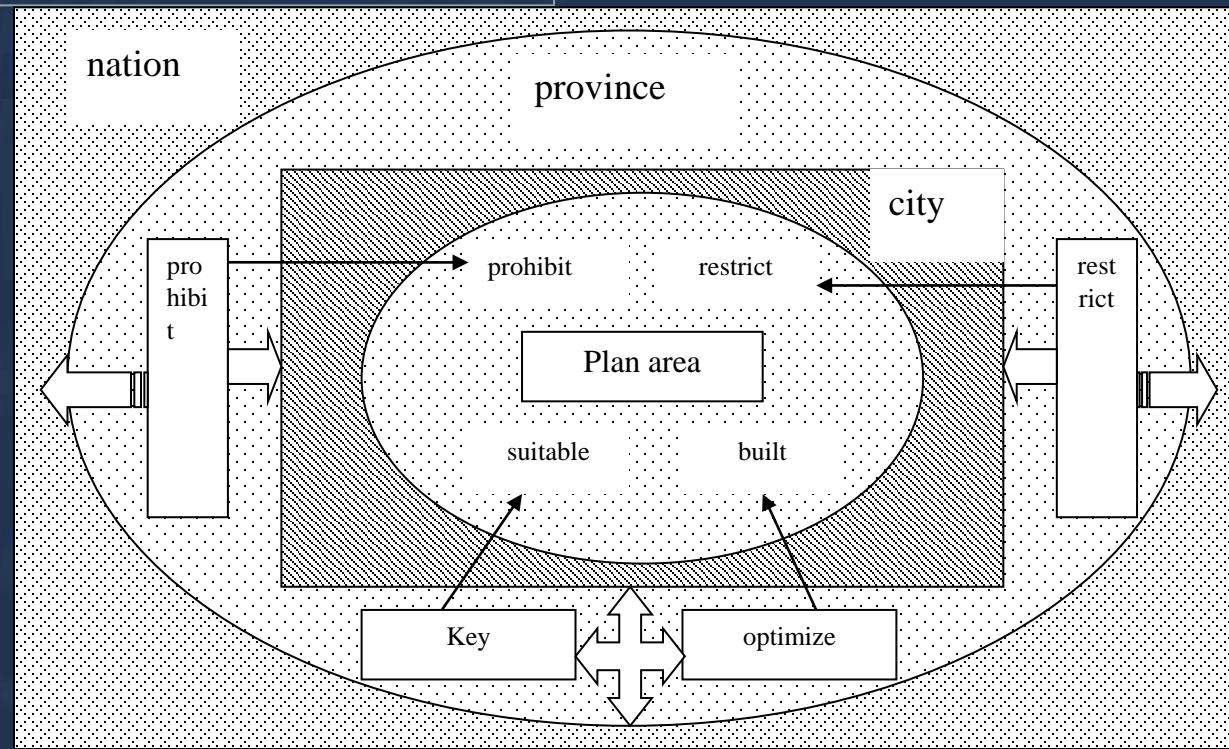


- Through comparative analysis of spatial boundaries between the main functional areas and the urban planning area, we can see that there existed a larger range of inconsistencies. At present the main functional areas used for more national and provincial level, although on the micro level in the cities and counties are also some other related, but mostly in discussion and exploration stage, so to the city, it belongs to the macro level; the urban planning area mainly within the scope of application fields in the city, relative to the market domain that belongs to the micro level; level view of the city in the domain area is outside the scope of the vacancies between the two parts, this requires the two complement each other, form a complementary relationship, rather than exclusion relations.

1. Systemic Problems of Spatial Boundaries



Will feature four main areas and urban planning areas of four districts within the space, we can find a similar correspondence between them, as shown, but the slash in the diagram are not part of the two areas of space control, it is necessary to explore this level the coupling relationship between the two.





1. Systemic Problems of Spatial Boundaries

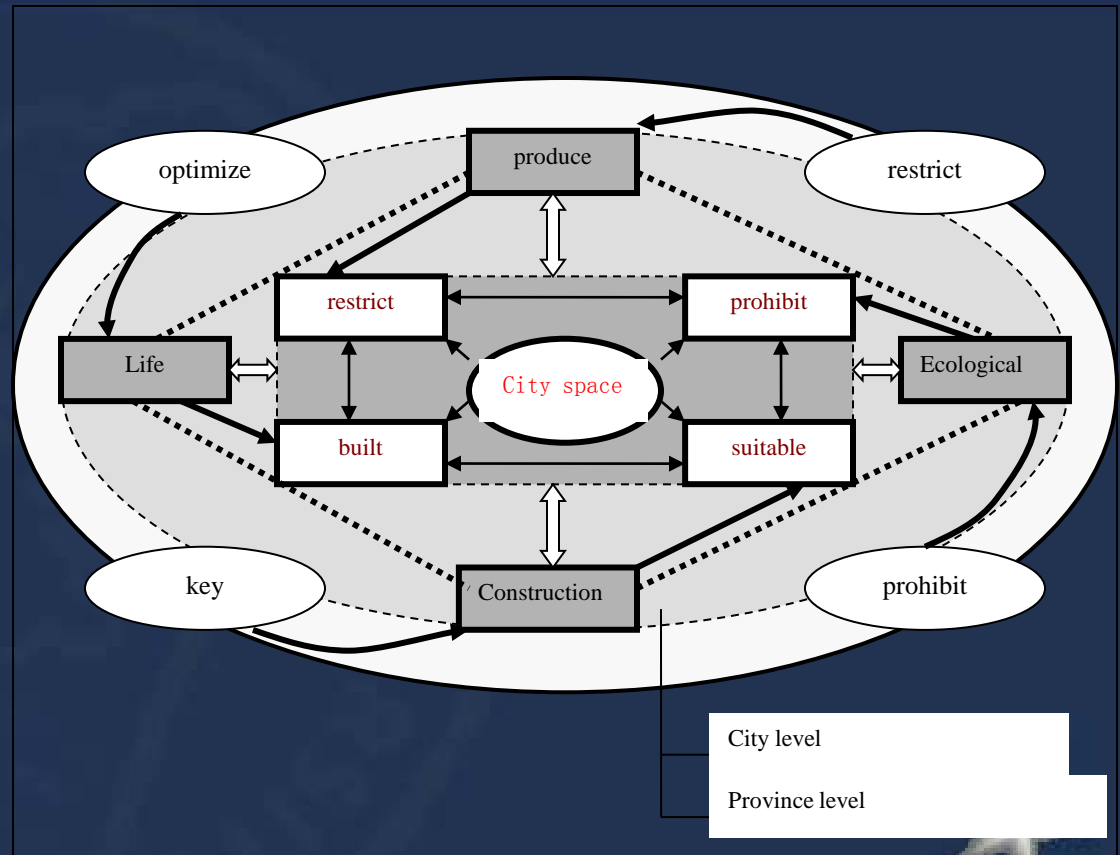
- 1.4 City level domain to establish P-C-L-E coupling space model
- City area spatial planning guidance is an important tool for spatial development, the purpose is to promote the orderly development of space, but space is divided urban planning control the growth of urban space is not the direct driving force, in order to guide development of the role of space, but also on the main features zoning of the space division, which determines the direction of urban development. Space zoning district on the site adhere to the principle of broad-brush, concerned about the ultimate development capacity, reflect the policies and strategies to guide, to the city planning area for the next layer to allow flexibility and room planning. At present, because different regions of space character, there is no uniform pattern space partition in the city municipal area, the common area are: the development of urban construction, agricultural development areas, ecological and environmental protection areas, also divided according to need strict protection zone, the control of protected areas, planning control zones (Liu Hongyan, 2007).





1. Systemic Problems of Spatial Boundaries

- 1.4 City level domain to establish P-C-L-E coupling space model
- Therefore it is necessary to study the urban city of the domain space unification model, where you can introduce the concept of coupling. Coupling is the concept of physics is that two or more of the system affect each other through a variety of interaction phenomena. Coupling space is the concept of borrowing coupled physics, is the region of interaction between factors and elements of the objective characterization of interdependence.





1. Systemic Problems of Spatial Boundaries

- 1.4 City level domain to establish P-C-L-E coupling space model
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2. Block functional coordination problems

区块功能协同性问题探讨

- 2.1 The main functional areas defined function blocks
- 主体功能区区块功能界定
- The main functional areas are based on resources and environment carrying capacity, existing development density and development potential, and consider the future of China's population distribution, economic distribution, land use and urbanization patterns, land space is divided into four main functional areas including optimization development, key development, restricted development, and prohibit development. The main functional areas redefined the zoning principle, division method of functional innovation. It is a comprehensive feature set of functional areas, on the one hand, it makes the national spatial planning system has become more dense; the other hand, it is also aimed at separating China's current space planning, and an attempt of improving co-ordination and strategic (Wang Yan, 2008), is to promote the coordinated development of the region a new idea (Makai, 2007).





Table 1 functional understanding of the main functional areas

| Type | Function block |
|-------------------------------|---|
| Optimization development zone | Higher density development, resources and environment carrying capacity has been reduced, strong economy and high density population centers |
| Key development zone | Resources and environment carrying capacity of strong economic and population concentration areas with better conditions |
| Restricted development zone | Weak resources and environment carrying capacity, large-scale economic and demographic conditions are not sufficient. Important areas for national or large regional ecological security. |
| Prohibited development zone | Established by law at all levels, all kinds of natural and cultural protected areas and other areas in need of special protection |



2. Block functional coordination problems

区块功能协同性问题探讨

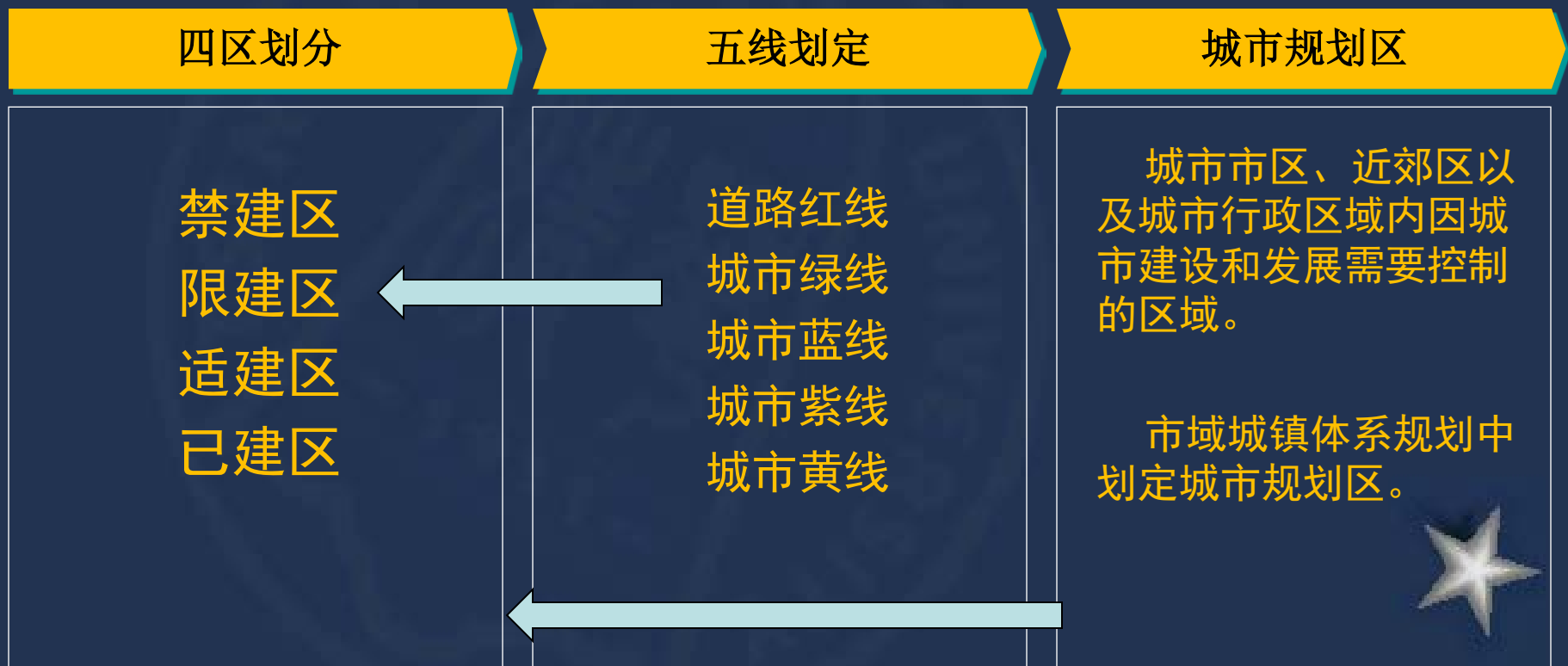
- **2.2 Urban planning area block function defined** 城市规划区区块功能界定
- In 2006 vision “Urban Planning Procedures” 31th article: downtown area should be divided into prohibited, restricted building area, suitable for the construction area and built space control measures of the areas development. After the implementation of the preparation method approach, based on the control area of the “four areas” gradually began to apply classification methods (Yuan Jinfu, 2008). In fact, before its promulgation, the major area of space control is the main function of the division method (priority development areas, development areas and restrictions on the development control area) to be divided, first name of the area is prohibit construction, control building area and should build area (Qiu Baoxing, 2006).
- Was divided into four areas for various development and construction activities to set the access threshold, set up a space access system, so as to achieve the purpose of guiding control, thereby ensure the effective implementation of space control.





2. Block functional coordination problems

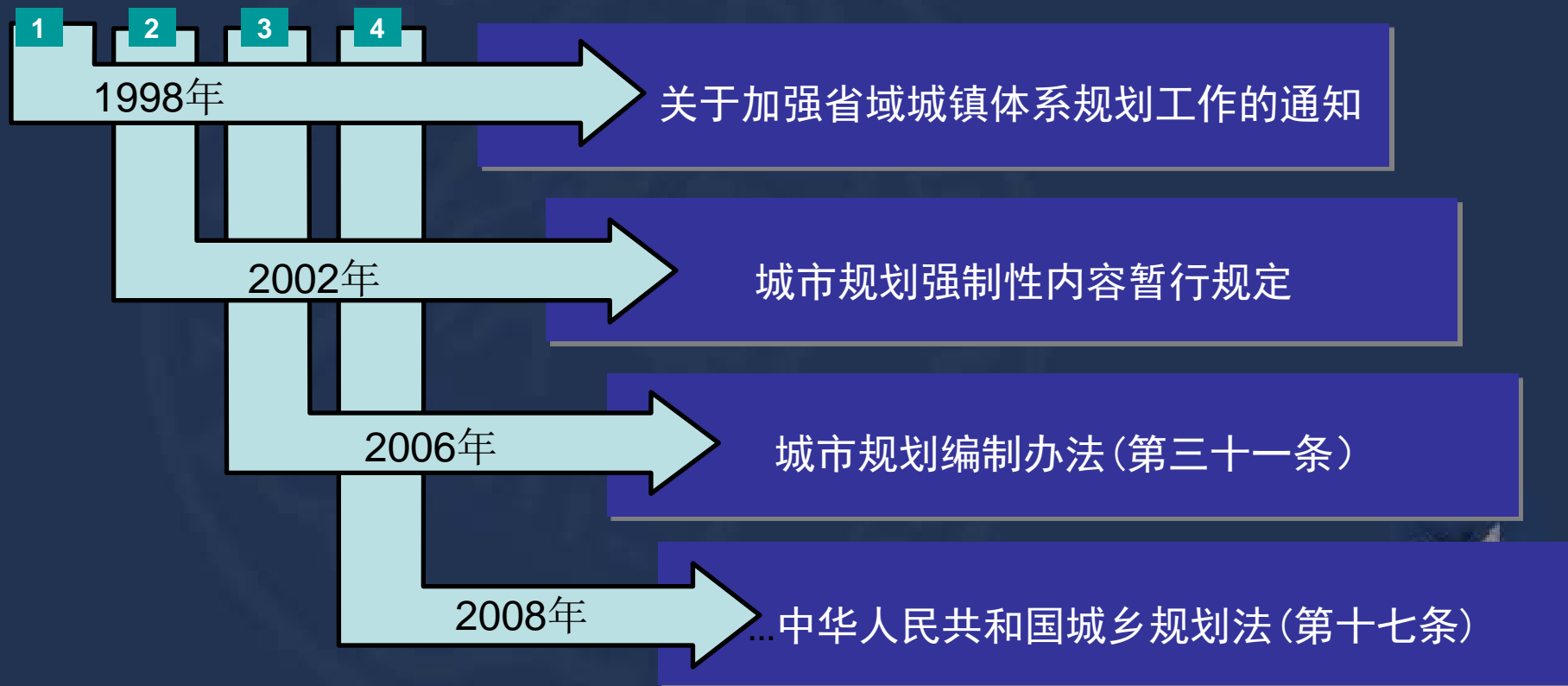
区块功能协同性问题探讨





2. Block functional coordination problems

区块功能协同性问题探讨



| 异同点 | 类别 | 主体功能区四区 | 城市规划四区 |
|-----|------|---------------------------|-----------------------|
| 不同点 | 权属部门 | 国家发改委 | 住房与城乡建设部 |
| | 主旨方向 | 定政策（基于空间定义的综合性政策引导） | 定布局（建设与非建设空间管制策略） |
| | 法律依据 | 政策精神支撑 | 城乡规划法 |
| | 规划特性 | 综合功能区规划 | 城市总体规划重要组成部分（专题或专项规划） |
| | 划分目的 | 保护环境资源 | 合理开发建设 |
| | 主要任务 | 明确四区内容（数量、位置、范围、定位、发展方向） | 规划期相关内容空间发展方向。 |
| | 核心内容 | 对国土空间的分析与评价 | 对空间进行具体的多元政策与策略建构 |
| | 划分基础 | 行政边界 | 自然要素 |
| | 实施目标 | 空间开发方案 | 空间协调 |
| | 划分顺序 | 先确定边界后分析均质要素性 | 先分析均质要素性后确定边界 |
| | 分区性质 | 主观分区 | 理性分区 |
| | 分区精度 | 结构示意性 | 刚性精确性 |
| | 空间范畴 | 唯一功能确立 | 职能与功能范畴复合 |
| | 行政划分 | 一定程度跨行政区 | 以行政区划为依托 |
| | 指标划分 | 指标相对规范 | 经验因素居多 |
| | 运作时序 | 禁止-限制-优化-重点 | 建成-禁建-适建-限建 |
| | 实施年限 | 没有年限 | 20年左右 |
| | 成果层次 | 宏观层面 | 微观层面 |
| | 成果表达 | 政策文本 | 规范化文本图则 |
| | | 约束效力 | 基础性功能 |
| 共同点 | 管理对象 | 针对城市空间管理进行的规划行为 | |
| | 宗旨 | 避免区域间的非积极博弈和不可再生资源的不当消耗 | |
| | 发展过程 | 从2005年开始先有理念再有实践逐步总结 | |
| | 重点转移 | 经济增长优先转为生态环境优先（不再优先关注GDP） | |
| | 出发点 | 生态承载力（内在动机是一致的） | |
| | 控制核心 | 空间资源（控制的是同一城市空间） | |



2. Block functional coordination problems

区块功能协同性问题探讨

- **2.3 Urban and regional planning collaborative analysis of functional space block**
- Two types of urban and regional planning are around the scientific utilization of space resources, the development of the different development objectives, content and control means, and have a common ground, there are contradictions and disorders of the place. Compared with the urban master planning, the main function of spatial planning truly established on reasonable basis of the prerequisite for development and scientific development the resource carrying capacity of the environment, a comprehensive, basic and innovative features (Zhang Li, 2007).
- The main functional areas planning is a major breakthrough in theory when a certain stage of social and economic development, China's national spatial zoning and planning, is the important basis for the preparation of urban and rural planning and the basis. It also inspired urban planning theory and practice of innovation (Wang Yan, 2008). Therefore, urban planning should take the initiative to undertake the main function zoning passed on the idea, and as a basis for the preparation.





2. Block functional coordination problems

区块功能协同性问题探讨

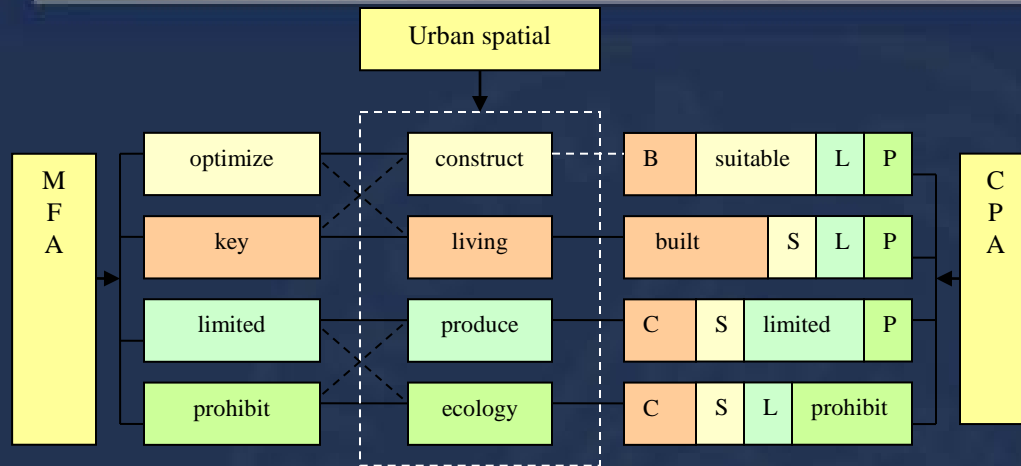
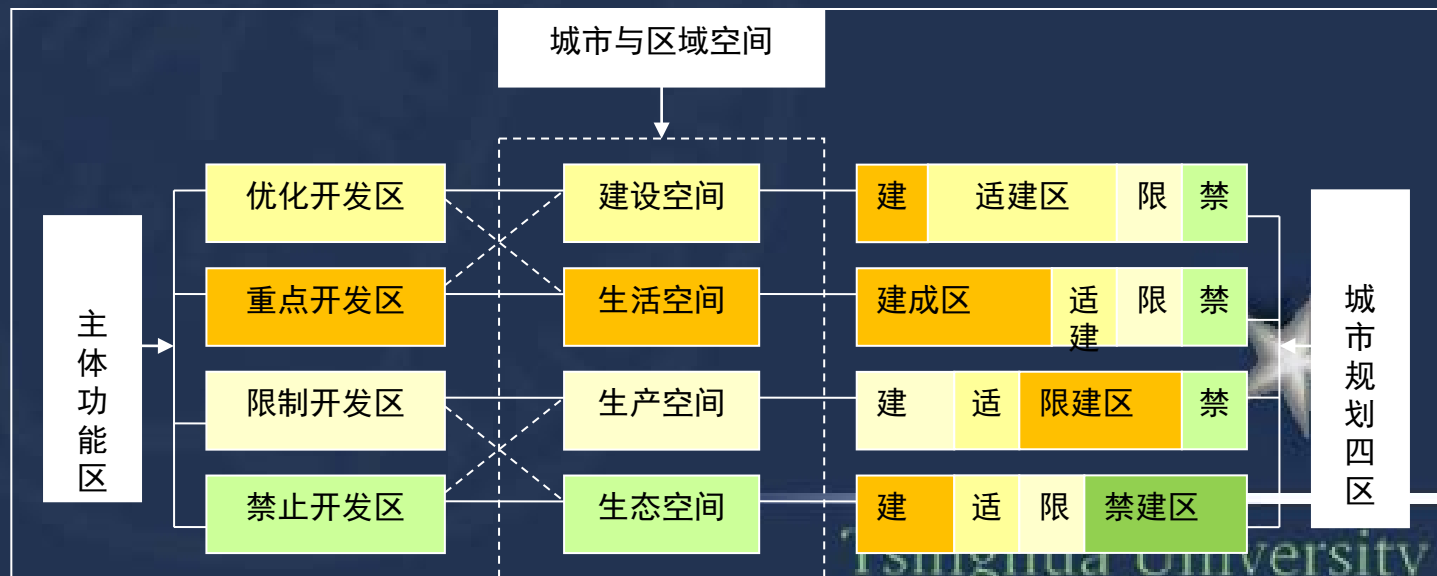


Figure 4 collaborative relationships of the main functional areas of space planning and urban master planning





3. Determine the domain space evaluation index system from city level 构建市域空间评价指标体系

After analyzing the consistency and inconsistency of both, you can clear the collaboration of the functional blocks between the main functional area and the urban planning area. Therefore we need to build and select the evaluation index system, in particular to select the evaluation parameters which have evaluation capacity to evaluate and analyze.





3. Determine the domain space evaluation index system from city level

构建市域空间评价指标体系

3.1 The main function area planning index system

主体功能区规划指标体系

The main function area index system should select representative indicators, such as carrying capacity of resource and environment, current density and intensity of development, developing potentiality and so on. We should focus on the key indicators of resources and the environment. The indicator system includes: building sites, environmental capacity of available water resources, ecological sensitivity, ecological importance, natural disasters, population density, intensity of land development, GDP per capita and its growth rates, accessibility, urbanization level, population movements, the industrialization level or industrial innovation, strategic choice or the importance of location.



| 指标分类 | 大类代码 | 指标分类 | 种类代码 | 指标名称说明 | 单位 | 指标类型 |
|----------|-------|----------|-------|--|--------|------|
| 经济指标 | 1 | GDP指标 | 11 | GDP总量 | 亿元 | 引导型 |
| | | | | 人均GDP | 元/人 | 引导型 |
| | | | | 服务业增加值占GDP比重 | | 引导型 |
| | | | | 单位工业用增加值 | % | 控制型 |
| 社会人文指标 | 2 | 人口指标 | 21 | 人口规模 | 亿元/KM² | 引导型 |
| | | | | 人口结构 | 万人 | 引导型 |
| | | 医疗指标 | 22 | 每万人拥有医疗床位数/医生数 | % | 控制型 |
| | | 教育指标 | 23 | 九年义务教育学校数量及服务半径 | 所、米 | 控制型 |
| | | | | 高中阶段教育毛入学率 | % | 控制型 |
| | | | | 高等教育毛入学率 | % | 控制型 |
| | | 居住指标 | 24 | 低收入家庭保障性住房人均居住用地面积 | 平方米/人 | 控制型 |
| | | 就业指标 | 25 | 预期平均就业年限 | 年 | 引导型 |
| | | 公共交通指标 | 26 | 公交出行率 | % | 控制型 |
| | | 公共服务指标 | 27 | 各项人均公共服务设施用地面积（文化、教育、医疗、体育、托老所、老年活动中心） | 平方米/人 | 控制型 |
| 人均避难场所用地 | 平方米/人 | | | 控制型 | | |
| 资源指标 | 3 | 水资源指标 | 31 | 地区性可利用水资源 | 亿立方米 | - |
| | | | | 万元GDP耗水量 | 立方米/万元 | 控制型 |
| | | | | 水平衡（用水量与可供水量之间的比值） | % | 控制型 |
| | | 能源指标 | 32 | 单位GDP能耗水平 | | 控制型 |
| | | | | 能源结构及可再生能源使用比例 | % | 引导型 |
| 土地资源指标 | 33 | 人均建设用地面积 | 平方米/人 | 控制型 | | |
| 环境指标 | 4 | 生态指标 | 41 | 绿化覆盖率 | % | 控制型 |
| | | 污水指标 | 42 | 污水处理率 | % | 控制型 |
| | | | | 资源化利用率 | % | 控制型 |
| | | 垃圾指标 | 43 | 无害化处理率 | % | 控制型 |
| | | | | 垃圾资源化利用率 | % | 控制型 |
| | | 大气指标 | 44 | 二氧化硫、二氧化碳排放削减指标 | % | 控制型 |



3. Determine the domain space evaluation index system from city level

3.2 Urban master plan index system

The current master plan index system is the start to reform since 2002. We didn't request strictly on space construction and space constraints. There are lack of study on the resources and environmental indicators. Wang Guangtao said in 2007: it is necessary to establish and improve the index system of urban planning. The group of the Ministry of Construction improved the index system of planning. They improved and replenished the current index system of urban master plan from 4 aspects: economic, social humanity, resources and environment. It included a total of 15 indicators and 27 specific requirements. But there is also lack of studies on quantitative perspective of the qualitative requirements, such as quantification of the mandatory content, resource intensive and quantitative indicators of environmental protection.



| 指标体系 | 指标功能 | 具体含义 | 计算方法 | 数据尺度 |
|------------|----------------------------------|--|---|----------------|
| 建设用地 | 评价一个地区对工业化和城镇化发展的剩余土地承载能力 | 采用适宜建设用地丰度指标进行衡量 | $(\text{剩余适宜建设用地面积} - \text{基本农田面积}) / \text{适宜建设用地面积} \times 100\%$ | 县级行政单元 |
| 可利用水资源 | 评价一个地区剩余水资源的开发利用潜力 | 采用可开发利用水资源丰度指标进行衡量 | $\text{可开发利用水资源量} - \text{已开发利用水资源量} / \text{可开发利用水资源量} \times 100\%$ | 县或更大范围行政区 |
| 环境容量 | 判断一个地区在生态环境不受危害前提下可容纳污染物的能力 | 综合分析环境对人类活动干扰的承受能力 | 环境容量指数=水或大气环境标准浓度值+影响水或大气环境容量的其他因素 | 县或更大范围行政区 |
| 生态敏感性 | 判断一个地区生态脆弱程度或对外开发的限制程度 | 度量生态脆弱性程度的复合性指标 | 生态敏感性指数=沙漠化分级+土壤侵蚀分级+石漠化分级+...分级 | 公里格网 |
| 生态重要性 | 评估特定区域的生态系统对全国或较大区域的重要程度与保护价值的大小 | 反应需要保护的特定动植物, 以及水源、湿地、森林、草原、自然景观等特殊生态功能区 | 生态重要性指数=森林+湿地+草原+生物多样性+..... | 景观尺度或公里格网 |
| 自然灾害 | 刻画自然灾害给人民生活和城市建设产生负面影响的程度或限制程度 | 综合反映洪水、干旱、台风、地震、地面沉降等自然灾害频发程度 | 自然灾害指数=洪水+干旱+台风+地震+..... | 县或更大范围行政区或公里格网 |
| 人口密度 | 评估一个地区现有人口分布的集聚程度和开发密度 | 反映每平方公里人口数量 | 人口密度=总人口 / 土地面积 | 县级行政单元 |
| 土地开发强度 | 评估一个地区国土开发利用强度 | 采用国土总面积中建设用地的比重指标 | 开发强度 = 建设用地 / 土地总面积 $\times 100\%$ | 县级行政单元 |
| 人均GDP及增长率 | 反映一个地区的经济开发密度和集聚能力 | 计算经济发展水平, 直接反映开发密度\发展潜力, 间接反映资源环境承载能力 | 人均GDP=GDP/总人口 | 县级行政单元 |
| 交通可达性 | 评估一个地区的基础设施建设水平和地理区位条件 | 综合评估某个区域到若干特指的不同影响力的中心城市的交通可达性 | 交通可达性=运输方式+线路等级+与重要城市距离+与重要海港或空港距离+..... | 县级行政单元或地级行政单元 |
| 城镇化水平 | 评估人口\经济集聚的能力, 以及国土开发的程度与潜力 | 人口城镇化的现状 | 城镇化水平=城镇人口/总人口 $\times 100\%$ | 县级行政单元 |
| 人口流动 | 判断人口和经济集聚的能力和潜力 | 反映一个地区经济增长的活力\城镇化的状态以及就业的潜力 | 人口流动强度=流动人口/常住人口 | 县级行政单元 |
| 工业化水平或产业结构 | 评估经济发展水平和国土开发密度以及未来增长潜力 | 反映工业化程度 | 工业化水平=工业增加值/GDP $\times 100\%$ | 县级行政单元 |
| 创新能力 | 评估一个地区发展的潜力 | 反映地区发展的创新能力 | 创新能力指数=科技开发投入+平均受教育年限+..... | 县或更大范围行政区 |
| 战略选择或区位重要度 | 判断一个地区在国际、国内的战略地位 | 用定性赋值的方式, 区别国际化程度不同以及具有不同政策取向的区域 | 战略选择或区位重要度=国际化程度+特殊类型区+..... | 县或更大范围行政区 |



3. Determine the domain space evaluation index system from city level

3.3 Construction of urban space evaluation index system

Quantitative of evaluation factor is the core of regional spatial control. The indicators should be differentiated at different levels of planning. For example, the main functional area planning is qualitative research emphasising on macroeconomic, which can be combined with statistical data comparative analysis; urban master planning emphasis on micro-planning area, which is quantitatively oriented and also have qualitative content. Urban space emphasises on the concept, in which the indicator system should be restricted and complemented by qualitative and quantitative studies.





3. Determine the domain space evaluation index system from city level

3.3 Construction of urban space evaluation index system

The urban space evaluation index system is basically relying on administrative regions, which is divided by towns and villages. Through the analysis on the environment carrying capacity of local resources, and analyzing the land resources, water resources, energy and environment, we create. It has four factor layers (the developing potentiality, intensity of development, sustainable developing capacity, environmental carrying capacity), 15 factor levels. And we defined the functions of the factors in order to carry out the exploitation control to the urban space, which can promote co-operation among all levels of planning to realize the harmonious development of socioeconomic, resources, ecology and environment.





3. Determine the domain space evaluation index system from city level

3.3 Construction of urban space evaluation index system

Qualitative research should involve the importance to location, accessibility, innovation, and natural disasters; quantitative research should be related to population, land use, economic, hydrological, environmental capacity and so on. Thus we need to re-define the zoning principle, and identify the dominant factors. Such as Beijing limited construction planning (2006-2020) which was divided by the five main elements: water, green system, culture, land and environment. Water elements include wetlands, rivers, lakes and water protection. Land elements include geological conditions, geological disasters and so on.

- 水
- 绿
- 文
- 地
- 环

| 序号 | 限建要素大类 |
|----|---------------|
| 1 | 河湖湿地 |
| 2 | 水源保护 |
| 3 | 地下水超采 |
| 4 | 洪涝调蓄 |
| 5 | 绿化保护 |
| 6 | 城镇绿化隔离 |
| 7 | 农地保护 |
| 8 | 文物保护 |
| 9 | 地质遗迹保护 |
| 10 | 平原区工程地质条件 |
| 11 | 地震风险 |
| 12 | 水土流失与地质灾害防治 |
| 13 | 污染物集中处理处置设施防护 |
| 14 | 电磁辐射设施（民用）防护 |
| 15 | 市政基础设施防护 |
| 16 | 噪声污染防护 |



Table 5 the space control indicator system based on the concept of the main functional areas

基于主体功能区理念的市域空间管制指标体系

| 主体功能区 | 基于主体功能区理念的衡量指标 | | | 延伸到规划区 |
|-------|----------------|------------|----------------------|--------|
| | 因素层 | 因子层 | 因子功能 | |
| 优化开发区 | 发展潜力 | 人口密度 | 评价现有人口集聚程度和开发密度 | 已经建设区 |
| | | 建设用地丰度 | 适宜建设用地丰度 | |
| | | 城镇化水平 | 评估人口经济集聚能力、国土开发程度与潜力 | |
| 重点开发区 | 可开发强度 | 土地开发强度 | 国土开发利用强度 | 适宜建设区 |
| | | 人均GDP及增长率 | 评价经济开发密度和集聚能力 | |
| | | 交通可达性 | 评价基础设施水平和地理区位条件 | |
| | | 工业化水平或产业结构 | 评估经济发展水平和国土开发密度发展潜力 | |
| | | 人口流动 | 评价人口和经济集聚的能力和潜力 | |
| | | 创新能力 | 科技开发投入和平均受教育年限 | |
| | | 区位重要度 | 定性赋值评价战略地位 | |
| 限制开发区 | 可持续发展力 | 可利用水资源 | 可开发利用水资源丰度 | 限制建设区 |
| | | 环境容量 | 分析环境对人类活动的承受能力 | |
| | | 自然灾害 | 评价负面影响程度和限制程度 | |
| 禁止开发区 | 环境承载力 | 生态敏感性 | 生态脆弱性程度复合指标 | 禁止建设区 |

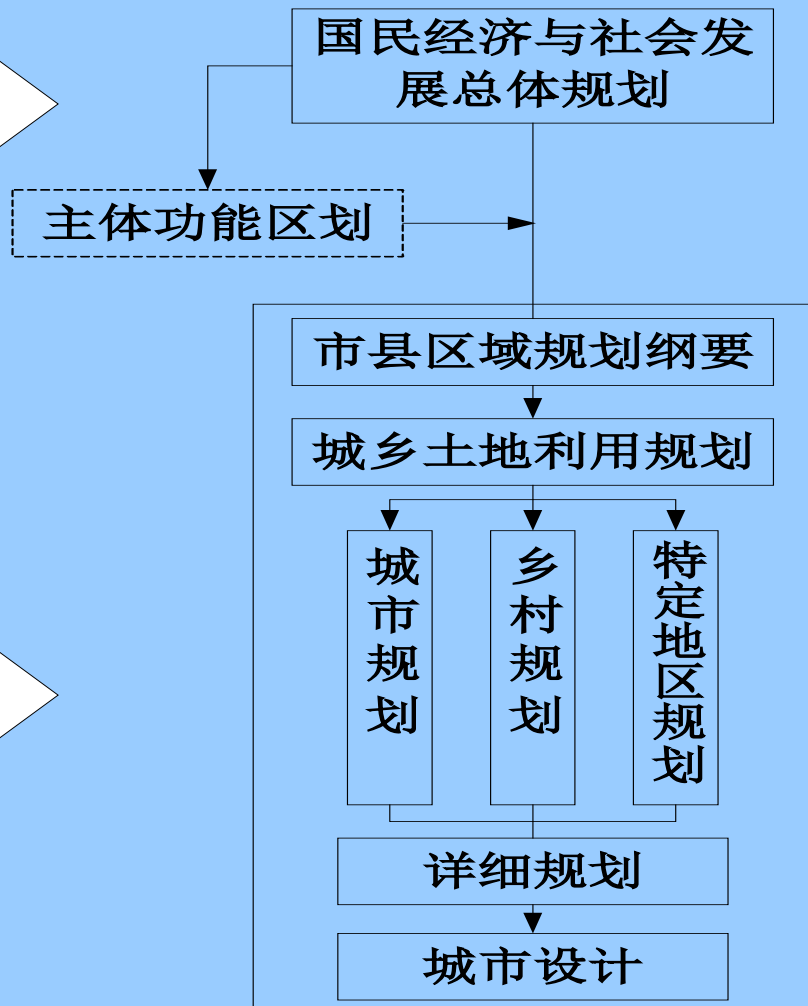
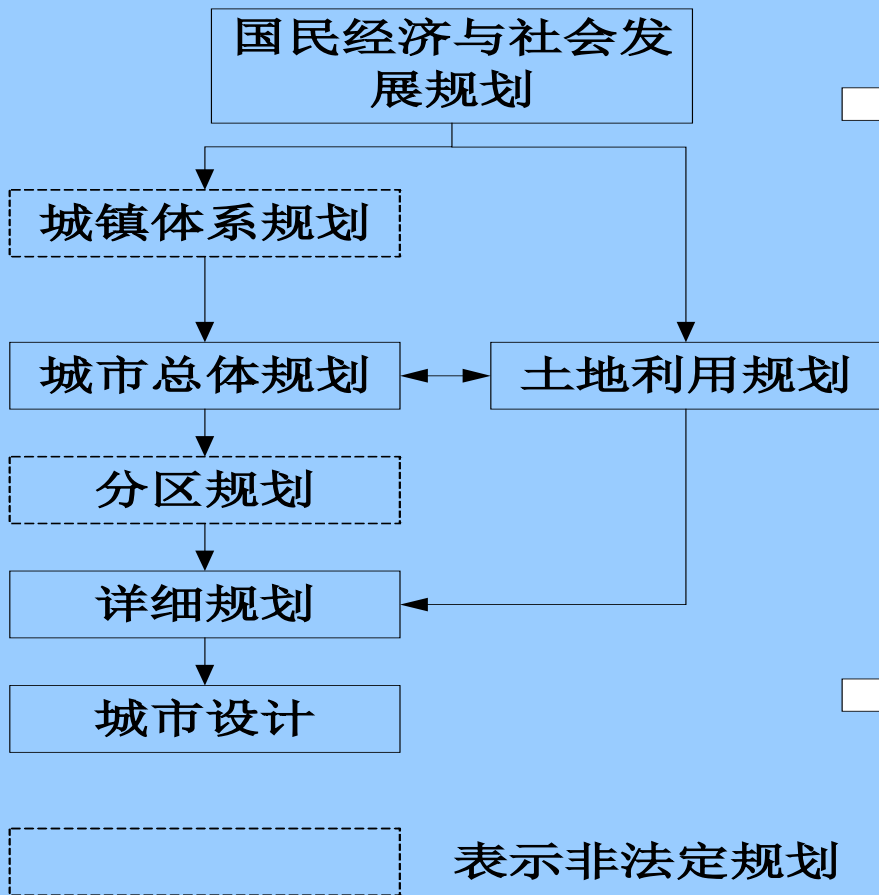


Conclusion

- Coupling analysis on the urban space level of the city master planning and the main functional area planning can improve the competitiveness of the urban and regional development, so as to improve the investment environment and enhance the living environment. It is clear that the city master planning and the main functional area planning has the inherent unity.
- From the views of space limits, function, target control, we can reveal the function type and the essence of spatial extent of the main functional areas (optimal development zones, key development zones, prohibited zones, restricted development zones) and the space control divisions of city master planning (prohibited-construction areas, restricted building area, suitable construction area, built area).
- We try to explore the main functional areas of system to a deeper level of expansion to urban space, proposing a coupling space model in the urban area (production space, living space, ecological space, building space). We build the space control system of the city master planning basing on the main functional area planning to provide the scientific reference to enhance the city master planning.



Conclusion





Reference

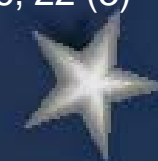
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- Thanks a lot!

