

Article

Planning Modes for Major Transportation Infrastructure Projects (MTIPs): Comparing China and Germany

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Abstract: Because major transportation infrastructure projects (MTIPs) have significant effects for a sustainable development, the planning modes used for these projects have been a popular topic among scholars and policy makers. However, detailed descriptions and comparisons of planning modes in different countries are still rare. Therefore, this paper first provides a simple analytical framework based on the elements of the planning goal, the planning process, the planning result and the evaluation criteria. Focusing on the hierarchic mode adopted in China, and the democratic participatory mode adopted in Germany, the governance practices used in MTIP planning are clearly shown. Furthermore, by using two airport cases, this paper compares the differences between China and Germany in the realms of preparation, review, coordination, final approval, and planning performance. The main conclusions are: (1) The analytical approach presented in this paper provides an appropriate standard for describing and comparing planning modes for MTIPs; (2) the planning modes in the two countries each have advantages and disadvantages, reflecting the trade-off between ex ante and ex post costs; (3) the comparison between China and Germany may be instructive for both of these countries and for other countries in terms of improving their planning performance in the future.

Keywords: MTIP planning; mode comparison; China; Germany; airport cases

1. Introduction

Major transportation infrastructure projects (MTIPs) often involve multi-level public and private stakeholders; such projects are also characterized by requiring huge investments, covering large areas and having broad influence [1]. For some time, the argument exists that the implementation of the principles of a sustainable development is significantly effected by infrastructure projects—especially in developing countries like China [2]. Therefore, the sustainability of infrastructure projects (e.g., MTIPs) themselves has to be improved. With regard to the importance of MTIPs and their potential far-reaching negative impacts for a sustainable development [3,4], the necessity of planning MTIPs has been widely accepted by both developing and developed countries [5,6]. As Dvir et al. [7] notes, planning cannot guarantee the success of project implementation, but projects without planning are likely to fail and become unsustainable.

In recent years, studies have investigated the topic of MTIP planning [8,9]. The problems arising from planning implementation (e.g., cost overruns) and the causes of these problems have been clearly revealed by scholars [10–12]. Although studies in this field began by addressing the problems

arising from planning, the discussion has gradually transformed and now focuses on the modes of governance used in the planning of MTIPs. Some countries have adopted a hierarchic mode, in which the government dominates project planning. For example, to enable quick responses to possible threats (such as frequent dam breaks and floods), Dutch infrastructure project planning has traditionally adopted a hierarchic mode [13]. Liu [14] argued that China's approach to the planning of major infrastructure has long maintained a system dominated by the central government. Liu [14] also showed how the central authorities of different departments carried out infrastructure policy formulation and project planning through coordination. Other scholars have found that environmental impact assessment (EIA) was the only form of public participation used in the planning of MTIPs in China and that the participation mechanism was flawed and could not effectively supervise the behavior of the government [15], thus confirming that the planning of China's MTIPs was hierarchic from another perspective. To constrain government action and improve performance in MTIP planning, a democratic participatory mode with an accountability mechanism has become more popular around the world [10]. Glasbergen & Driessen [13] discussed how the planning of infrastructure projects in the Netherlands changed from a hierarchic mode to an interactive mode by creating a new political space in the context of change in the institutional environment. Some scholars have focused on the use of EIA in MTIP planning and examined how EIA with public participation affected decision-making at all stages of planning in the context of UK practice [16]. Furthermore, some studies have insisted that public participation is not a panacea and that a democratic participatory planning mode is more conducive to the sustainable development of infrastructure projects and promotes cooperation and consensus among different actors [17].

Although previous studies have discussed the practice and performance of planning modes in different countries, comparative research on the two planning modes mentioned above is still rare. Moreover, many scholars have compared the institutional arrangements of different planning modes from the perspective of transaction costs and have proven their applicability based on both theoretical and empirical analyses [18–20]. Relying on Williamson [21], who provided a classification of transaction costs, the transaction costs of planning are divided into two categories, i.e., ex ante costs and ex post costs. Considering that planning MTIPs entails a series of transactions, ex ante costs and ex post costs of different planning modes are important distinguishing factors. However, so far, these key factors have not been extensively discussed in the comparison of MTIP planning modes. Therefore, to address the shortcomings of existing studies, this paper attempts to compare these two planning modes using airport cases in China and Germany. The research questions in this paper are further summarized as follows: (1) For MTIP planning, what are the differences between the hierarchic planning mode used in China and the democratic participatory planning mode used in Germany? (2) What are the impacts of these two different planning modes on the performance of MTIPs?

In short, the objectives of this paper are to: (1) Provide a detailed description of the governance structure of MTIP planning in China and Germany, which is still rare in the current literature. Moreover, such description can be helpful for people who are interested in the hierarchic planning mode and the democratic participatory planning mode to understand the specific project cases; and (2) to make a preliminary comparative analysis of the two planning modes based on two airport cases from different countries. Regarding the comparative approach, we use Tan et al. [22,23] as our main references.

2. Scheme of the Research

In order to achieve the above objectives, the paper conducted research as follows. First, an analytical framework for MTIP planning is developed to describe and compare the governance structure of MTIP planning in the two countries. Second, we describe the governance structures of MTIP planning in both countries, emphasizing their planning goals and planning processes. Third, we use two airport cases, Hangzhou Xiaoshan International Airport (HGH) in China and Berlin International Airport (BER) in Germany, to identify further differences between the two planning

modes in the realms of preparation, review, coordination, final approval and planning performance. Finally, we discuss the results and draw relevant conclusions from the planning practices examined.

2.1. Research Material and Methods

We choose HGH and BER as comparable cases for two reasons: On one hand, the physical situation of the two airport cases is similar, e.g., the planning period (both in the 1990s to 2000s), project size and socio-economic conditions in the respective regions are all similar. These similarities remove interference from certain factors and provide an objective basis for case comparison. On the other hand, these two airport cases are representative of the MTIP planning modes used in the two different countries. As typical MTIPs, these two cases show how each planning mode was applied in reality in the respective countries, which ensures the validity of comparison.

The data of these two cases were collected during the period of 2015–2017. The data collection for HGH was mainly conducted through semi-structured interviews, household survey and file reviews in relevant organizations. Similarly, in the BER case, we conducted a literature review, site visits, public document reviews and semi-structured interviews with different stakeholders. Semi-structured interviews are a method of interview that can be considered in-between a structured interview which is based on pre-coded categories of questions and no attempt to reach great depth, and an unstructured, as well as open-ended interview which is based on general questions to keep the interview moving and to reach depth [24]. Against this background, our semi-structured interviews were predicated on semi-planned and semi-standardized questions, mostly asked in a free order depending on the practical interview process. In overall, we did three semi-structured interviews in HGH case, each of which took approximately 3 h; and six semi-structured interviews in the BER case, each of which took approximately 2 h. Considering that the comparative analysis in this paper does not require quantification, the data is qualitative. The main information regarding data collection is listed below (see Table 1).

Table 1. Main information regarding data collection.

Case	Organization	Respondents	Type	Date
HGH	Xiaoshan Archives	N.A.	File review	4 2016
	Xiaoshan branch of the Hangzhou land and resources bureau	Local officials	Semi-structured interview	9 2015
	Hangzhou airport economic area administration commission	Local officials	Semi-structured interview	9 2015
	Neighboring villages (<i>Nanxiang</i> , etc.)	Villagers	Semi-structured interview & Household survey	9 2015
	Xiaoshan branch of the Hangzhou land and resources bureau	N.A.	File review	12 2016
BER	Joint Spatial Planning Department Berlin Brandenburg (<i>Gemeinsame Landesplanungsabteilung Berlin Brandenburg</i>)	Federal State officials	Semi-structured interview & Public document review	10 2015
	Berlin-Brandenburg Airport limited liability company	Department managers	Semi-structured interview & Public document review	10 2015 & 6 2017
	Neighboring communes (district & municipality)	Local officials	Semi-structured interview & Public document review	11 2015 & 2 2016
	Neighboring resident groups	Citizen representatives	Semi-structured interview	11 2015

2.2. A Comparative Analytical Framework for MTIP Planning Modes

The comparative study of MTIP planning in this paper is done qualitatively and based on a description of relevant literature, documents and cases. Two studies by Tan et al. [22,23] provide a research paradigm for such study: The former is a comparison of land conversion governance structures, while the latter is a comparative study of governance structures related to ecological offset policies. Both studies include China and Germany as comparative cases. Drawing on these studies, we develop an analytical framework for MTIP planning modes (Figure 1).

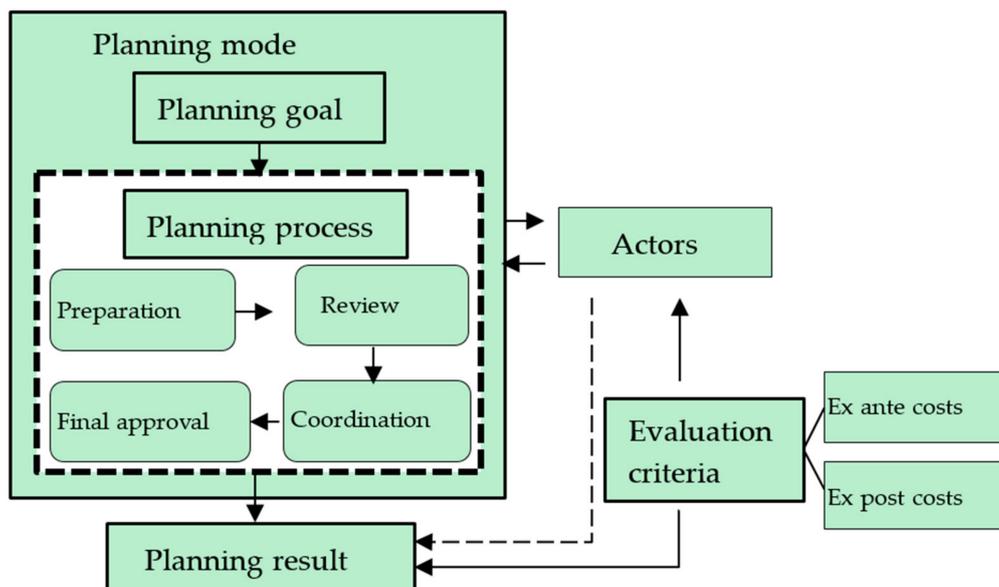


Figure 1. A comparative analytical framework for major transportation infrastructure projects (MTIP) planning modes. Source: Own graphic.

Specifically, the analytical framework contains four elements, as follows:

- (1) **Planning goal.** This element refers to the targets actors are expected to achieve when implementing planning activities. For example, planning goals include ensuring the smooth development of MTIPs, reducing environmental impacts and protecting the rights and interests of affected stakeholders. The planning goals of a country are primarily determined by the actors' values and preferences [25]. In addition, planning goals are the reason why MTIP planning is designed and organized in a country, and they indirectly affect the performance and outcome of planning to a certain extent [23]. In other words, planning goals in countries that choose different MIP planning modes are fundamentally different. For instance, the planning goal in China is investment for economic growth, while in Germany it is revitalization and social development (e.g., environmental protection).
- (2) **Planning process.** The planning process is the core of the planning mode, providing detailed procedures to show how a certain planning mode works. It involves many decision-making processes and directly affects the success of MTIPs. According to some studies on planning practices in different countries [26,27], we divide the planning process into four stages: Preparation, review, coordination, and final approval. During the planning process, actors take steps to promote the implementation of project planning according to their roles. In these four stages, public participation takes place to a greater or lesser extent, including hearings, surveys, and announcements. According to the classification of public participation recommended by Arnstein [28], public participation can be divided into eight types, that is, manipulation, therapy, informing, consultation, placation, partnership, delegated power, and citizen control. The first two types fall in the 'nonparticipation' level of participation, the middle three fall in the 'tokenism' level, and the last three fall in the 'citizen power' level. Therefore, we highlight the degree of public participation to distinguish different planning modes.
- (3) **Planning result.** The result can be understood from two perspectives. The first is the potential physical result caused by planning implementation, such as land conversion and environmental pollution. The second is the result of interest distribution among stakeholders, such as compensation to affected farmers for land acquisition and environmental pollution.
- (4) **Evaluation criteria.** To compare the performance of different planning modes, the evaluation criteria of ex ante and ex post costs is proposed. Ex ante costs refer to transaction costs that

occur before planning approval; they include time, information collection, and decision-making. Ex post costs refer to a series of transaction costs that occur after planning approval, such as the supervision of planning implementation and adjustments for improper planning. In order to roughly measure ex ante costs, we use two indicators, which are length of time to complete planning and budget overruns, according to Tan et al.'s [29] practices with regard to land conversion transaction cost estimation. Regarding the measurement of ex post costs, based on the definition of Williamson [21], we use the indicators of degree of adjustment (e.g., the remedies for insufficient environmental impact mitigation) and degree of conflict (e.g., scale, number) resulting from planning failures with regard to cost estimates. The evaluation criteria of transaction costs do not enable the conclusion that the performance of mode A is better than that of mode B. However, such criteria could lead to other useful assertions, such as that in terms of ex ante cost saving, mode A is better than mode B, but mode A is inferior to mode B in terms of ex post cost saving [20].

3. Planning Modes for MTIPs: The Choices of China and Germany

In terms of planning for MTIPs, China and Germany have chosen the modes of hierarchic planning and democratic participatory planning, respectively, based on their planning goals. How these two modes operate will be explained in Sections 3.1 and 3.2.

3.1. Hierarchic Planning Mode: Practices in China

3.1.1. Planning Goal

As a developing country, China is actively implementing massive investment in the construction of MTI. Under the Belt and Road policy (*yi dai yi lu*) and new urbanization (*xinxing chengzhenhua*), the scale and speed at which major transportation infrastructure (MTI) are constructed will continue to expand. During the 13th five-year plan period, the Chinese government is focusing on carrying out 302 MTIPs in the fields of railway, highway, airport, urban rail transit, and waterway construction from the year 2016 to 2018; these projects involve a total investment of approximately 4.7 trillion CNY [30]. In this context, the main goals of MTIP planning in China include (1) actively guaranteeing the smooth development of MTIPs. As a boost of economic and social development, MTIPs not only improve the overall welfare of society, but also stimulate local GDP and mitigate employment problems. Therefore, both the central and local governments hope to improve the efficiency of planning so that projects can enter the construction and operation stage as soon as possible and bring about social and economic benefits. (2) Control risks caused by the projects. On the one hand, due to the rapid land conversion underway in China, the government is under pressure to preserve a minimum of 120.3 million ha of farmland in consideration of food security [23]. Therefore, MTIPs must be placed under the government's farmland protection policy to prevent the phenomenon of farmland over-occupation. On the other hand, due to soft budget constraints and economic competition, it is common for local governments to blindly initiate MTIPs that consume huge investments. Therefore, preventing the financial risks of projects at the local level is another factor that the central government should consider.

To realize these planning goals, the Chinese government has historically followed the path of the planned economy and uses a hierarchic planning mode led by the government.

3.1.2. Planning Process for MTIPs

In China, the planning of MTIPs in which the government invests directly must follow a strict approval system. Specifically, planning decision-making is the responsibility of the Department of Development and Reform Commission (DDRC), with the assistance of other governmental departments (e.g., department of planning, land administration and environmental protection). The details of the four stages of planning will be described below.

Preparation Stage: Draft Design and Materials Preparation

After the conceptual idea of the project is proposed, the preparation of the project proposal is first added to the agenda by the land developer of the MTIP. The project proposal focuses on preliminary judgment of whether the project is a viable investment. The proposal relies on techno-economic proof of the MTIP and preliminary analysis of the project site, project size, investment estimate and fundraising. The proposal's purpose is to examine the necessity of constructing the project.

In addition to the preparation of the project proposal, both project site selection and environmental impact assessment (EIA) will be completed during the preparation stage. Under the current legal and planning framework, the analysis of the project site is generally based on the function of the MTIP and on a comparative selection of alternatives that meet the requirements; the goal is to propose a site with a techno-economic advantage.

EIA refers to the prediction and estimation of the impacts of the MTIP on the surrounding environment, with the goal of proposing measures to prevent or mitigate negative effects. According to the EIA Law promulgated in 2002, EIA should cover initial environmental conditions, the impact of project construction on the surrounding environment, economic profit and loss analysis, and the recommended measures for environmental protection. As one part of EIA, public participation in China began in the 1980s and was encouraged under the EIA Law [15]. The project developer and its entrusted planning agency are responsible for implementing the public participation process in EIA. Furthermore, the Ministry of Environmental Protection issued the *Provisional Measures for Public Participation in Environmental Impact Assessment* in 2006, which stipulated the specific procedures as follows: (1) After assigning the EIA task to a planning agency, the project developer shall disclose information, including project profile and the methods of public participation within seven days; (2) after completing the EIA, the project developer shall publicize a draft report through social networks, the media, etc., and the publicity period for seeking public comments shall not be less than 10 days; (3) the project developer shall address the public comments and ask the planning agency to provide feedback to the public. In practice, in order to collect public comments, the project developer and its entrusted agency usually select participants according to factors, such as occupation, age and degree to which they are affected by the project. In other words, who has the right to participate is not clearly defined, and the project developer selects the participants at its discretion.

According to Article 18 of the *Administrative Measures for Direct Investment Projects in the Central Budget*, the project developer must also submit a Feasibility Study Report (FSR) to DDRC as the main basis for project investment decisions. The preparation of FSR includes the following three aspects: (1) A field investigation to learn about the land use status in the project area and to collect local information about natural, economic and social conditions. (2) A proposed plan idea based on the intensity of land development in the future. Furthermore, the project plan and design must be determined in detail; this should include site selection, land occupation, construction scale, function layout and other technical parameters. The investment budget should be prepared based on the preliminary planning scheme; and should (3) predict the impact of project construction on the economy, society and ecological environment.

The above preparation materials (i.e., project proposal, site selection report, EIA report, FSR) are generally undertaken by planning and design institutes with professional qualifications. The project developers will submit these documents as the draft project plan to the governmental departments for review and approval. In the hierarchic planning mode, almost every application document requires review and approval before the next application will be considered [14].

Review Stage: Departmental Discussions

The application of the draft project plan must be assessed and reviewed by DDRC and other government departments. In China, the government will delegate project assessment tasks to experts and agencies with professional qualifications, and the assessment results will be an important basis

for department reviews [31]. Specifically, the contents and corresponding procedures of the planning reviews undertaken by different government departments are introduced as follows:

First, the project proposal requires expert review. Then, the project developer submits a project proposal to DDRC at the provincial or central level (depending on the project level of the MTIP) for comments on the feasibility and operability of the project; the goal is to advance to the approval of the project proposal.

Second, according to Article 12 of the *Administrative Measures for Direct Investment Projects in the Central Budget*, after DDRC approves the project proposal, the draft plan will be reviewed by the departments of urban and rural planning, land administration, environmental protection and so on for approval.

The EIA report completed by professional agencies is reviewed by the environmental protection department. In other words, the department will propose a judgment regarding whether the project plan meets the environmental protection requirements and then make some comments on the EIA for approval. According to the *Regulations on approval procedures for EIA document of Construction Projects* promulgated in 2006 by State Environmental Protection Administration (SEPA), the review of the EIA report has three main purposes: (1) Examine whether the project falls under the institutional framework of laws and policies, e.g., relevant laws and regulations on environmental protection, specialized planning for MTI, regional planning and overall urban planning; (2) assess the impacts of the project on the surrounding environment and environmental capacity in the project area; ensure the proposed control measures enable pollutants (e.g., noise created by airports) to meet national or local emission standards; and (3) pay attention to remedial measures for ecological protection. This means that the department will examine the effectiveness of the proposed measures with regard to preventing and containing ecological damage. During the review of the EIA report, the environmental protection department has the right to hold hearings on projects that may seriously affect the lives and environmental quality of local residents or projects that have major divergences in environmental protection comments; the department then makes comments on environmental protection approval by seeking the opinions of experts and the public.

The developer should submit the draft plan to the land administration department for land use pre-examination applications. According to the *Administrative Measures on Land Use Pre-examination for Construction Projects* issued by the Ministry of Land and Resources, the land administration department first examines whether the project site selection complies with the Land Use General Plans (LUGP, *tudi liyong zongti guihua*), as well as with the land supply policy and land legal system. Second, the Chinese government controls land management by implementing a land quota system, which means that projects involving land conversion must obtain a quota for newly added construction land and add the same amount of cultivated land to comply with the dynamic balance policy [32,33]. Therefore, the land administration department should also examine whether the land use proposed for construction projects meets the requirements of land use quotas and whether the farmland supply proposal is feasible. Regarding the public interest, the newly added construction land required for the project is acquired by the government through land acquisition compensation [34]. To supervise the local government so that it does not violate the legitimate rights and interests of the land-expropriated farmers, the land administration department needs to verify the funding arrangements for land acquisition compensation in construction projects. Last but not least, the MTIP may involve a revision to the LUGP, and the responsibility of the land administration department is to examine whether the revised proposal of the LUGP and the impact assessment for the revision conform to relevant land laws and regulations.

According to Article 36 of the Urban and Rural Planning Law of China, the project developer must apply to the urban and rural planning department for site selection comments before the project plan is approved by the DDRC. The site selection report will first be reviewed by experts and local planning departments. On the basis of whether the project conforms to urban and rural overall planning,

the superior planning department will review the report again and make a decision on site selection approval according to the comments on the preliminary review.

Finally, the project developer can submit the FSR to the DDRC for comments until the review of the EIA, land use and site selection is completed. When assessing the FSR, the DDRC generally deputizes reputable agencies that have professional qualifications (e.g., CIECC, China International Engineering Consulting Co., Ltd., Beijing, China) to conduct a techno-economic assessment. If the MTIPs are vital, an expert review system will also be implemented for FSR assessment.

Coordination Stage: Final Design Determination

The project developer needs to give feedback and revise the draft project plan promptly based on the review comments of relevant departments and the assessment reports provided by the respective agencies. For example, during the pre-examination of land use, due to the large amount of farmland that must be occupied for MTIPs, such as airports and railways, it may happen that project plans do not comply with the LUGP in practice (e.g., basic farmland occupation). According to article 26 of the Land Administration Law of China, in the event that the location and land use scale of MTIPs are fixed and unchangeable, the LUGP may be adjusted by the prescribed procedures. The application for LUGP revision first requires review from experts and local land departments, which is obtained through hearings and planning revision assessment. Then the review results of this application must be submitted to the higher-level land department for approval. In addition, in response to the assessment comments made by professional agencies, especially the comments on the FSR, the project developer needs to revise the project plan—by complying with the comments in principle—to ensure smooth approval.

Finally, when the projects become eligible after reviewing and coordinating, the relevant government departments will issue approval documents as the main basis for the final decision of the DDRC. That is, the environmental protection department issues the approval documents for EIA; the land administration department issues the approval documents for the land use pre-examination; and the planning department issues the approval documents for the site selection. For any project that fails to pass, the corresponding department must explain the reasons for disapproval, and the project developer has to re-apply for approval after modifying the corresponding documents in the draft plan.

Final Approval Stage: Decision-Making by Superior Government

After the assessment of the draft plan and the department review are completed, the core of the final approval stage is the FSR approval by the DDRC. Based on the assessment report, the DDRC approves the FSR when the project complies with relevant laws and regulations and with specific construction conditions. Depending on the size of the investment, different levels of the DDRC have their own approval authority for MTIPs. In practice, projects requiring an investment of more than 50 million CNY are approved by the National Development and Reform Commission (NDRC), and projects requiring an investment below 50 million CNY are approved by the Provincial Development and Reform Commission [14].

According to Article 18 of the *Administrative Measures for the Direct Investment Projects in the Central Budget*, the FSR approval is the most important stage of planning decision-making with regard to project construction. The project developer could apply to the urban and rural planning department for planning permission and apply to the land department for permission to use state-owned land following FSR approval within the validity period, which means that the project is officially transferred from the planning process to the construction process.

3.2. The Democratic Participatory Planning Mode: Practices in Germany

3.2.1. Planning Goal

As a developed country, Germany has completed MTI layout and construction since the Second World War, but there is still demand for new constructions, as well as MTI renewal (e.g., many worn-out highway bridges require rebuilding). According to the Plan for Federal Traffic Routes 2030 (BVWP 2030, *Bundesverkehrswegeplan 2030*), from 2016 to 2030, 226.7 billion Euros will be invested by the federal government in the preservation of existing infrastructure, as well as in new construction and expansion projects for federal highways, railways and waterways in Germany [35].

According to the requirements of BVWP 2030, the main goals of Germany's MTIP planning are (1) to achieve mutual harmony between land use and natural environment. The German government and the public are especially concerned about land use cover change and environmental impacts brought by project construction [23]. Therefore, it is important to comprehensively assess and respond to ecological and environmental problems during the planning process, such as the limitation on occupying additional ecological space. (2) It is important to mitigate the negative effects of stakeholders involved in land use. MTIPs will cause negative externalities (e.g., noise pollution by airports). Mitigating those negative externalities and improving the quality of life of affected residents is another planning goal for MTIPs in Germany. (3) It is important to guarantee the social and economic benefits of project investment; achieving the maintenance, upgrading and transformation of MTI, and improving the operational efficiency of the transportation network through scientific planning and decision-making is the third goal that the German government considers.

To realize the above planning goals, the German government uses a planning mode with democratic participatory characteristics [36].

3.2.2. Planning Process for MTIPs

Unlike in China, the planning process for MTIPs in Germany involves extensive public participation. The governance structure of the planning process is introduced below.

Preparation Stage: Draft Design and Materials Preparation

Once an idea for MTIP construction is proposed, the first important task in preparing planning documents is the basic assessment of the project by means of cost-benefit analysis (CBA) and environmental impact assessment (EIA). To be consistent with public interests, MTIPs must prove their economic feasibility through CBA. As the basis of planning decision-making, CBA assesses the overall priority of alternative projects through ranking [37]. According to the calculation of the benefit-cost ratio, projects with a ratio below "1" will be classified as "no need" and will be excluded from consideration immediately. Projects with a ratio greater than "1" will be classified as "priority needs" or "further needs" based on other indicators (e.g., spatial location, ratio size). In recent years, given the growth of ecological awareness, in some cases, environmental costs and the loss of ecological services have been measured and considered in monetary terms as part of CBA [38]. Furthermore, it is also essential to carry out EIA for alternatives. In general, EIA covers the following environmental issues impacted by project implementation: Surrounding residents, animals and plants, soil, water, air, landscape, cultural heritage, and other protected assets. The EIA is conducted with public participation. According to the EIA results, the alternatives can be compared and ranked [39].

After a basic assessment is completed, the next task is to implement regional planning and determine site selection. Based on the results of CBA and EIA, the local authorities evaluate different locations and recommend a location in accordance with regional planning procedure (*Raumordnungsverfahren*). Nevertheless, the recommendation is not legally binding during decision-making about site selection [40]. To comply with spatial planning systems, regional plans and regional impact assessments must be conducted. Eventually, the state, district and municipality make co-decisions to determine the final location of a project.

According to Section 73 of the Administrative Procedure Act, the developer is required to submit the planning documents to the relevant federal authorities after the site selection is completed. (The authorities are not the same for all MTIPs; e.g., a railway project is overseen by the Federal Railways Authority [41], while an airport project is overseen by the Federal Ministry of Economic Affairs [40].) The planning documents mainly consist of plan design, the EIA report and corresponding explanations [41], which will generally be organized by professional planning companies. The plan design is the core of these documents and is generally structured as follows: (1) Collecting and analyzing basic information, such as natural, economic and social conditions; (2) setting planning targets for project construction; (3) developing comparable alternatives according to relevant sectoral planning laws (e.g., the plan design of airports is regulated by the Federal Air Traffic Act), and (4) assessing the various alternatives objectively, which serves as preparation for subsequent participation in and coordination of planning.

Review Stage: Public Involvement

According to Section 73 of the Administrative Procedure Act, the planning documents submitted by the developer must be discussed in detail by the affected residents or resident representatives so that they have an opportunity to make comments and put forward objections. In addition to affected individuals, public authorities, such as NGOs, neighboring municipalities, and government departments at various levels also have the right to participate in project planning [42].

Public participation in project planning is generally divided into two stages. In the first stage, the municipal government has the obligation to explain planning information (e.g., planning objectives, principles, main contents, impacts) to residents and ask for advice on alternatives. Organizing an on-site reception in the planning area, setting up a special reception time for the public, and holding a small planning exhibition are the main tools used in this phase. In recent years, the government has started to use the internet for public participation, especially in the case of large projects, such as MTIPs. In the second stage, the responsible authority sends the planning documents of MTIPs to the corresponding municipal government. Within three weeks of receipt, the municipal government is required to put the planning materials on public display for a period of one month [41]. After two weeks of publicity, affected individuals can present their comments on or objections to project plans. Those objections are recorded as a transcript and become an important reference for plan modification. However, if the affected residents have already conducted a thorough inspection of the project plan in advance, the municipal government can forego public display with the agreement of the public [41].

Stakeholders such as public authorities can participate in project planning by giving comments. The developer submits the planning documents to the responsible authority, which again delivers the planning documents to the public authorities whose interests are affected by the project. Those authorities make comments on the plan from their own perspectives. The public authorities are required to submit their comments within a month of receiving the plan, and the deadline may not exceed three months [41]. Except for significant issues or comments, comments on the plan that are received beyond the deadline are not considered during planning coordination. In practice, the public authorities' comments and the second phase of resident participation are carried out at the same time for the purpose of expediency.

Coordination Stage: Final Design Determination

The objections (e.g., to noise pollution, ecological loss) submitted by the residents and public authorities are discussed openly during planning coordination. Several plan modifications are used to ensure that divergent opinions reach agreement (as much as possible) regarding the project plan.

According to Section 73 of the Administrative Procedure Act, the public hearings are organized by the responsible authority. During the hearing procedure, the developer, local authorities, and citizens affected by the project are invited to discuss and address the objections. To coordinate various objections from different stakeholders, the responsible authority requires in-depth investigation, which should

produce more planning information on MTIPs; furthermore, experts may be invited to conduct special evaluations. Feedback on whether the objections should be accepted or rejected is given on the basis of trade-offs, but this feedback is not legally binding. The municipal government must deliver and explain the feedback to the stakeholder who formally lodged the objection. The number of hearings and the amount of time to be invested both depend on the number and the level of objections [26].

As the hearing discussion proceeds, the modification of the original plan takes place according to the coordination results. If the basic framework and main content of the project plan are fundamentally changed, the public participation process must be repeated. If the basic framework is unchanged, but there are slight changes in plan content, a new project plan is required to inform the affected stakeholders, who are then invited to inspect the plan and provide comments.

According to Section 73 of the Administrative Procedure Act, with a month after completion of public hearings, the responsible authority is required to submit coordination results, modified plans, comments of public authorities, and objections unsolved to the planning approval authority.

Final Approval: Decision-Making and Its Legal Effects

According to Section 74 of the Administrative Procedure Law, the approval authority (e.g., state or district administration) makes a Planning Approval Decision (*Planfeststellungsbeschluss*) in light of the discussion about objections and the coordination results. In addition to approve the project plan, the approval decision also addresses the objections that are not resolved during the coordination procedure [41]. For the sake of fairness and reasonability, the handling principle is that the developer must take positive measures to mitigate or avoid negative spillover effects. When such measures are impractical or irreconcilable with the project, the affected stakeholders have the right to claim reasonable monetary compensation from the project developer.

To make the procedure transparent, the developer and affected stakeholders have to be informed about the Planning Approval Decision in a timely manner. The decision, the approved plan, and planning advice on legal remedies are displayed to the public for two weeks for inspection. If affected stakeholders (e.g., neighboring municipalities) are still against the project plan, they can file a lawsuit to challenge the planning approval in court [40].

After Planning Approval, the period of public display and possible lawsuits, the Planning Approval Decision becomes legally effective and therewith legally binding [41]. The Planning Approval Decision regulates the relations of rights and obligations under law between the developer and the affected parties. On the one hand, the project developer can implement the project based on the final plan approved within the period of validity. Individuals or organizations are not allowed to intervene in the implementation of the project plan. Moreover, due to the concentration effect, approval by other authorities (e.g., permits under building regulations) is not required before implementing the plan. This means that the Planning Approval Decision includes the other public authority decisions that are required according to other provisions [41]. On the other hand, the project developer has the obligation to provide effective measures or monetary compensation to the affected stakeholders under the supervision of the approval authorities. If the project developer does not start the project plan within five years, the approval decision expires.

4. Comparison of Governance Based on Two Airport Cases

The MTIP planning governance practices of the two countries described above show that China and Germany attribute different roles and competences to the public, various departments and various governments (see Figure 2). To further elucidate the differences in planning modes and planning performance between the two countries, we select two airport projects, i.e., Hangzhou International Airport (HGH) from China and Airport Berlin Brandenburg (BER) from Germany, for case comparison.

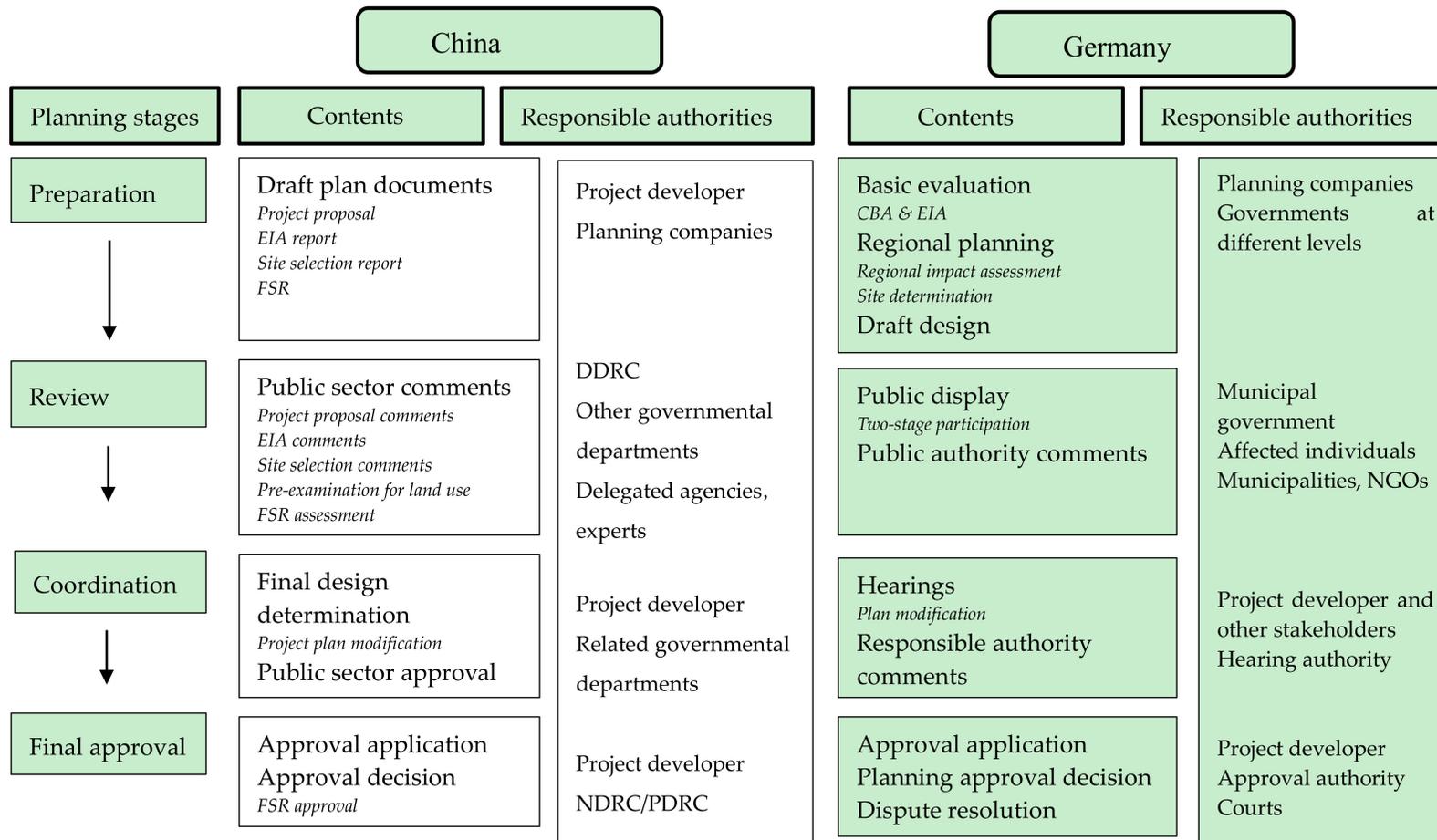


Figure 2. Planning processes of the two planning modes in China and Germany. Source: Own graphic. EIA, environmental impact assessment; FSR, Feasibility Study Report; DDRC, Development and Reform Commission; NDRC, National Development and Reform Commission; CBA, cost-benefit analysis, NGO, Non-Governmental Organization.

4.1. Case Background

Case 1: As a major transportation hub, HGH is located in Xiaoshan of Hangzhou municipality (the capital city of Zhejiang Province), which is 27 km from the center of Hangzhou. The airport covered an area of 484 ha in the first phase, expanded to 997.8 ha in the second phase and will cover a total area of 1468 ha by 2035. Since beginning operation in 2000, the capacity of HGH has increased annually, and it has been one of the top 10 busiest civil airports in China.

Preparation for planning this airport began in 1992 and involved EIA, site selection and a feasibility study. Over a period of two years, site selection was completed, and the central government chose Xiaoshan as the location for HGH in 1994. The EIA report and FSR were approved in 1997, marking the formal launch of the first phase of HGH. In 2005, the second phase of HGH started with planning; a review was conducted by the environmental protection and land administration departments, and the NDRC made the decision to approve the airport expansion in 2007. Overall, during the planning process, the final approval authority over the airport project was controlled by the NDRC. In addition, various governmental departments also played an important role in airport planning. However, public participation was only reflected in the display of the EIA, and civilian power was weak in the planning of this airport.

Case 2: As an airport that covers an area of about 1470 ha, BER is located in Schönefeld, a municipality of the State of Brandenburg, 24 km from the center of Berlin. The idea to build a new capital airport was put forward in 1990, right after the German reunification. The State of Brandenburg initiated the Regional Planning Procedure, including CBA, EIA and site selection in 1993, and in 1996, the governments reached a consensus decision with Schönefeld as the location for the new airport (Actually, Schönefeld already had a small airport, so the BER airport project became the upgrade of Airport Berlin-Schönefeld). Then, the governments closed the State Development Program (*Landesentwicklungsprogramm, LEPro*) and the Common State Development Plan of Rural Suburban Zone (*Gemeinsamer Entwicklungsplan engerer Verflechtungsraum, LEP e.V.*) in 1997, making the site selection legally binding. In 1999, the land development plan regarding securing the airport location (*Landesentwicklung-splan Standortsicherung Flughafen, LEP SF*) became legally effective, and the planning approval application was submitted. Through two-stage participation and continuous lawsuits during this period, the Federal Administrative Court revised planning approval decisions by the State of Brandenburg and authorized the verdict of airport construction in Schönefeld in 2006. Although the construction of the airport was subsequently launched, the opening was postponed for technical and political reasons. Throughout the whole planning process, the court system and the state government played crucial roles in decision making. Through extensive public participation, civilian power also played a comparatively important role in airport planning.

4.2. Planning Mode and Its Performance: Airport Cases from China and Germany

Through case comparison using the analytical approach mentioned above, the differences in planning modes, as well as their differences in performance, are compared and discussed from five perspectives, as shown below (see Table 2).

4.2.1. Preparation

In the preparation of the planning documents, professional planners were necessary for many tasks, such as land surveys, investment analyses, and engineering design. Therefore, project developers in China and Germany both outsourced technical work to third-party professional institutions.

Table 2. Planning processes and the performance of MTIPs in China and Germany: Two airport cases compared.

	HGH Case	BER Case
Preparation	<ul style="list-style-type: none"> • Comparatively simple, only in EIA, site selection and FSR • Limited public participation (only in EIA); the central government and political decisions played significant roles in site selection • More concern with economic and social benefits than with environmental impact 	<ul style="list-style-type: none"> • Comparatively complicated, including CBA, EIA, LEPro, LEP e.V. • Extensive public participation, the governments and political decision played a significant role in site selection • More concern with environmental issues than economic and social benefits
Review	<ul style="list-style-type: none"> • Citizen participation is rare • Experts were invited to conduct a techno-economic assessment • Public sectors involved themselves in examination 	<ul style="list-style-type: none"> • Public participation 1 held by MIL's Public Display Authorities in 2000 • Public participation 2, as well as comments from public authorities (authorities, unions, clubs, churches, etc.) held by the MIL's Hearing Authority in 2001
Coordination	<ul style="list-style-type: none"> • Issues focused on planning adjustment • Hierarchical coordination, e.g., coordination meeting at provincial level held in 2006 	<ul style="list-style-type: none"> • Issues focused on objections • Explanations for balance of interests, e.g., hearings • Many lawsuits regarding to LEPro, LEP SF and LEP e.V. in constitutional court in Brandenburg, the Higher Administrative Court of Brandenburg
Final Approval	<ul style="list-style-type: none"> • Approval authority was the Central government (NDRG) • The approval decision was administratively binding • The decision couldn't be challenged in court 	<ul style="list-style-type: none"> • The approval authority was state government (Brandenburg) • The ultimate approval verdict was legally binding • The decision was challenged in the Highest Administrative Court of Brandenburg and the Federal Administrative Court
Performance	<ul style="list-style-type: none"> • Efficient, time-saving (nine years) and no overruns in the budget • Ex post conflicts, e.g., mass disturbance of land-expropriated farmers in second phase of airport construction • High cost of remedial measures, e.g., subsequent remedy to address noise pollution 	<ul style="list-style-type: none"> • Time delays in planning process (16 years) • Participation (e.g., Citizens' Dialog) and lawsuits added extra costs, resulting in cost overruns • The possibility of ex post conflicts seemed to decrease

Source: Authors' own survey.

However, in their detailed implementation of the projects, the two countries show two significant differences. The first difference lies in the emphasis on the content of plan preparation. In the HGH case, the preparation documents were completed by the China civil aviation design institute, the Zhejiang engineering survey institute and other institutes. The draft plan mainly included a site selection assessment, an economic investment assessment, EIA, and an engineering design program; the focus was more on economic feasibility than on assessing the impact to natural ecological systems. In contrast, in the BER case, in addition to CBA and EIA, the latter involving multiple alternatives (seven possible locations) and completed by planning companies, there were other documents, such as *LEPro* and *LEP e.V.* used in preparation. The assessment of multiple alternatives through five criteria, and in the assignment of weights to the five criteria, the weight (30%) of the airport's environmental impact was the highest; it was higher than the weight (20%) of profitability. The corresponding weight attributed to those criteria, meant that more attention was paid to environmental impact than to profitability.

The second difference is the relationship and interaction among actors in the planning procedure for preparation. In China, public participation is limited and only occurs in the field of EIA. In the HGH case, the discussion was limited and confined to the control of noise pollution. The local

government publicized the EIA of HGH, including a noise-control plan, and sought comments from neighboring residents. However, this type of public participation, which lacked corresponding operating procedures and measures, ultimately did not make sense. Likewise, there was no public participation in site selection, and the central authority and local political mediation played a decisive role in decision-making. It was clear that the local officials of Xiaoshan County made use of their political resources in competing with other counties for the airport project. They engaged in considerable lobbying to leading cadres of the army, civil aviation authorities, the Zhejiang provincial government and the Hangzhou prefectural government, explaining the scientific basis and preferential policy favoring airport construction in Xiaoshan. The document of *Request for the location of Hangzhou International Airport Construction Project in Xiaoshan* in June 1992 showed that the local government was willing to provide about 330 hectares of state-owned construction land for the airport without a land transfer fee. The government was also willing to undertake the tasks of land requisition, demolition and land servicing for this airport. Through political operation and positive attitudes, the selection of Xiaoshan recommended by the Zhejiang provincial government was approved by the State Council and Central Military Commission in 1995.

In Germany, public participation and legal procedures are taken seriously, although the site decision is made by the governments. In the assessment of BER, site selection, professional site assessment and voluntary mediation processes were completed first, and a formal regional planning procedure was initiated in 1993. Site selection of Schönefeld became legally binding through *LEPro* and *LEP e.V.* in 1997. Under rigorous procedures, regional planning assessment, including EIA, was carried out with extensive public participation. While this type of public participation could slow down the site selection process, it could not substantially effect the results of decision-making. In the BER case, regardless of the citizen objections and ranking according to the professional evaluation, the decision about Schönefeld as the airport location was made by the Federal Ministry of Traffic, the Mayor of Berlin and the Prime Minister of the State of Brandenburg.

4.2.2. Review

The actors involved in the review stage have an important impact on the result of MTIP planning. The review of draft plans in China is reflected in the seeking of comments from different government departments. To ensure the scientific soundness of the review, the relevant departments also invite experts and reputable agencies to participate in the assessment of the project plan, but the public, who is directly affected by the project, is excluded. In the case of HGH, the SEPA of China first invited experts to conduct a technical assessment of the EIA report and then made a comment on implementing a controlled plan for areas that exceeded the environmental standards for airport noise. Similarly, through the assessment by CIECC, the NDRC proposed, in the FSR, some modifications to the planning of the terminal and parking apron. Due to the lack of public involvement, the departments had incomplete information when they provided the comments, which may have increased the ex post costs of planning.

In contrast to China, not only public sectors but also citizens affected by MTIPs participated in project planning in Germany. It seems that almost all the stakeholders involved in a project are invited to give their own opinions at different stages. The BER case shows that public participation 1 was held twice in 2000, and the planning documents submitted by the Airport-Berlin-Schönefeld Company were exhibited publicly in the affected communities (e.g., the neighboring municipalities). This disclosure of information was carried out by the MIL's (the Ministry of Infrastructure and Land Use Planning of the State of Brandenburg) Public Display Authorities. Then, public participation 2 took place twice in 2001, and the objections of the affected residents and statements from public agencies (authorities, unions, clubs, churches, etc.) were collected by the MIL's Hearing Authority. During that period, a total of 133,684 objections of over 60,000 objectors were collected [43]. Through two-stage public participation, the airport plan was reviewed, and the public's opinions were fully expressed.

4.2.3. Coordination

China and Germany adopt different coordination methods. In China, the revision of the draft plan is mainly to respond to the review results of government departments, and appealing to the interests of the affected individuals (e.g., increase the compensation standard for land acquisition) is not the focus of coordination. To pass the review of departments and obtain approval, coordination faces the challenge of revising the draft plan to meet the requirements of laws, regulations and planning policies. For example, the MTIPs cannot conform to the LUGP and must adjust the LUGP to pass the review. To solve this coordination problem, China has adopted an internal coordination method that uses government-led planning adjustment. In the case of HGH, the first round of LUGP had just been implemented and was not yet complete in Xiaoshan County; hence, there was no coordination of planning adjustment in the first phase. However, because of basic farmland occupation and land use for resident resettlement in the second phase of HGH, the land department of Xiaoshan County had to adjust four township-level LUGPs according to the indications of a provincial government meeting in 2006.

Coordination in Germany mainly focuses on project externalities (e.g., noise pollution, ecological compensation) and land acquisition compensation issues. Germany uses a public coordination method, and one of the main tools is a series of hearings organized by a specific department. All stakeholders (e.g., affected individuals and public agencies, project developers) in a project can negotiate with each other on issues and objections and reach a consensus (as much as consensus is possible), because they are given equal positions in hearings. The transparent procedure of this coordination is protected by law. In the BER case, the hearing for plan interpretation was held in 2001; the goal was to find a balance of interests among stakeholders, but that result was not achieved. Therefore, in the practice of BER, lawsuits in court had become the main way to coordinate effectively. In 1999, neighboring municipalities filed a lawsuit against the *LEPro* in front of the constitutional court in Brandenburg; that lawsuit ultimately failed. In the same year, affected municipalities lodged another lawsuit against *LEP SF* in front of the Higher Administrative Court Brandenburg in Frankfurt Oder. The lawsuit was dismissed, because the *LEP SF* was revised by both federal states before a verdict was returned. Moreover, the municipalities' lawsuit against the *LEP e.V.* concerning the location decision was granted in front of the Higher Administrative Court of Brandenburg in 2001. Through lawsuits and debates in courts, some aspects of the treaties mentioned above were revised in 2003. This at least showed that some conflicts of interest were balanced by the courts.

4.2.4. Final Approval

At the final approval stage, there are three important differences between China and Germany. First, in China, the final approval decision is made by the national or provincial development and reform commissions. Compared with Germany, approval decisions are made at a higher level, and the hierarchical control is stronger. As a national project investing more than 10 billion CNY, the project plans for HGH (for the first phase and second phase) were approved by the NDRC in 1997 and 2006. In Germany, however, a planning approval decision is generally made by the federal state or district administration, and the federal government has no approval authority. In the BER case, the decision to upgrade the airport at Schönefeld was approved by the Brandenburg State Government in 2004, although this Planning Approval Decision was revised by the court.

Second, although in both countries, the project developers can carry out construction after the final approval, this exclusive right is different. In other words, the approval decision made by the DDRC in China is administratively binding, while in Germany, only the final approval decision that takes effect after an appeal period is legally binding.

Third, the Chinese government has powerful authority over approvals, which means that the approved plan cannot be challenged by affected individuals or organizations who are not satisfied with remedial measures. In contrast, in Germany, individuals or organizations affected by project plans can protect their rights and lodge an appeal through an independent court system. In the BER

case, after the approval decision was made by the Brandenburg State, thousands of affected actors filed lawsuits against it. The lawsuits were filed from the Highest Administrative Court of Brandenburg to the Federal Administrative Court. Until 2006, the Federal Administrative Court authorized the upgrading of Airport Berlin-Schönefeld with a safeguard provision concerning noise pollution control. Daily protection goals stipulating a maximum level of 55 dB in residential areas and only irregular air traffic between 00:00 and 05:00 were defined legally. Furthermore, as a response, the Brandenburg State integrated the verdict of the court into its approval decisions and added a clause that no air traffic would be allowed between 23:30 and 05:30. This sequence of events showed that going to court was the last resort in the effort to protect individual rights from the abuse of public power.

4.2.5. Planning Performance

The structure of the planning mode eventually influences the performance of MTIPs. This comparative discussion of the performance of two countries does not determine which country's planning process is better, but rather provides a neutral evaluation. We evaluate the performance of each airport case based on the criteria of ex-ante costs and ex-post costs.

In China's hierarchic planning mode, the economizing effect of ex-ante costs is obvious. Given that MTIP construction can stimulate local economic growth, the timing of the development of the HGH project was strongly controlled by the local government. The duration of the planning process for HGH was very short: From the initial idea to final approval of the project plan, the first phase lasted 6 years and the second phase lasted three years. Meanwhile, it is because of the short planning period that subsequent construction could be carried out on schedule and avoid the risk of cost overruns. However, the low ex-ante cost was accompanied by high ex-post costs. Among these costs are continuous protests (e.g., group petitions) by affected farmers regarding land expropriation disputes. In the second phase, the construction of HGH, because land expropriation compensation was not coordinated and balanced during the planning process, farmers who had lost land were not satisfied. Concerned about resettlement and subsequent livelihood issues, a group petition with thousands farmers finally emerged, affecting the normal operation of the airport. Other costs are expensive remedial measures resulting from the negative consequences of environmental impact. In the HGH case, although the EIA was approved by the environmental protection department, the treatment of noise pollution was not taken seriously. This noise problem was exposed after the beginning of airport operation, resulting in public protests and complaints. Ultimately, to resolve this issue, the county government had to spend two years to reenact a new noise treatment program to satisfy affected residents.

In contrast, the democratic participatory planning mode in Germany shows different results. The ex-ante costs are high in terms of time consumed as well as human and material resources. In the BER case, it took 16 years from the initial ideas to the final settlement of legal disputes about the airport plan. In terms of budget enforcement, 5.4 billion euros had been spent, with an overrun of 125% by the end of 2014 [44]. In addition, extensive public participation (e.g., Citizens' Dialog) did not necessarily ease or accelerate the planning process and could not change the final planning results (e.g., site selection), leading to additional costs. The high ex-ante cost seemed to be balanced by the relatively low ex-post cost. Compared with the HGH case, land expropriation was reasonably compensated, and the control of noise pollution was finally decided by the Federal Administrative Court in the BER case, avoiding conflict and riots afterwards. In other words, these coordination affairs were solved during the planning process, reducing ex-post costs.

5. Discussion: Implications from Modes Description and Case Study

Based on the background of the planning modes and the comparison between China and Germany using airport cases, we attempt to discuss the essential differences in planning goals and governance characteristics and the reasons underlying the respective performance of the planning modes.

5.1. Essential Differences in Values Underlying Planning Goals

China and Germany have different planning goals, because they have different values, which has not been noted in previous studies. To some extent, the orientation of values determines how an institution is designed, i.e., what type of governance structure is chosen [45]. As a developing country, China prioritizes efficiency in MTIP planning. After the reform and opening up policy, the central government led by Deng Xiaoping put forward the slogan “development is the absolute principle” (*fazhan caishi ying daoli*), which rooted the concept of economic development deeply in people’s hearts. In addition, in the context of fiscal and promotion incentives, local governments and local officials are motivated to encourage major infrastructure investment and stimulate GDP growth in order to take the lead amongst fierce economic competition [46,47]. Therefore, investing to accelerate economic development is the primary goal of MTIP planning for the current Chinese government.

In contrast to China, given a socio-economic context of completion of industrialization and urbanization, Germany pays more attention to the protection of the ecological environment and the private rights of its citizens. In a word, MTIP planning in Germany prioritizes social justice. Indeed, eliminating negative externalities, such as land use cover change and the environmental impact of MTIPs is the focus of the public’s attention. Furthermore, affected individuals and groups have the right to defend their own interests and achieve procedural fairness and justice. Citizens can vote with their feet, making local governments more accountable to the public [48]. Therefore, achieving social harmony in the renewal and revitalization of major infrastructure has become the primary goal of the German government in carrying out MTIP planning. In a certain sense, these essential differences in values indirectly guide China’s and Germany’s choice with regard to their respective planning modes.

5.2. The Differences in Governance Characteristics of Planning Modes

In China, the hierarchic planning mode is more centralized. The main governance characteristics are: (1) MTIP planning is highly controlled by the central and provincial governments, and different governmental departments are responsible for promoting MTIP planning under their jurisdiction; (2) the NDRC is charged with decision-making with regard to planning approval and plays an important role in the planning process; and (3) there is limited public participation, and planning is relatively closed within the government. In contrast, the democratic participatory planning mode in Germany is more decentralized. The main governance characteristics are summarized as follows: (1) The local government at the state level initiates the MTIP planning procedures; (2) local governments with decision-making authority are balanced by an independent court system; and (3) there is extensive public participation, and the project planning process is open to the public.

Comparing the MTIP planning practices in China and Germany, the main difference between the two planning modes is the degree of public participation. Until now, public participation in MTIP planning in China’s hierarchic mode has been limited to EIA, and it takes the form of information dissemination with little consultation, falling within the lower levels of ‘tokenism’ according to Arnstein [28]. In China, public participation is still understood as informing the public of their rights and obligations rather than taking the public’s voice seriously [49]. Due to the low level of public participation, it is difficult to ensure that public opinions are accepted and addressed, which may lead to the abuse of public planning power. In contrast, in Germany’s democratic participatory planning mode, the degree of public participation is comparatively high, taking the form of placation and partnership and thus falling into the first levels of ‘citizen power’. In Germany, due to the whole-cycle process of public participation, the public can put forward objections and negotiate with project parties, which leads to opportunities to modify and improve plans. In this planning mode, the expansion of public planning power is limited to a certain extent, so that MTIP planning can achieve a satisfactory outcome for most people.

5.3. The Reasons Underlying the Pros and Cons of Each Planning Mode

Overall, the strength of the hierarchic planning mode is *ex ante* cost savings. Surprisingly, MTIP planning in China is generally conducted over a short period and incurs no budget overruns, which is inconsistent with the observations in the literature [10]. This strength enables China to meet the needs of domestic public infrastructure construction in a timely fashion and enhances the global competitiveness of the MTIPs. There are two possible explanations for this strength. First, due to its centralized nature, the hierarchic structure functions to control planning timing and avoid out-of-control MTIP costs. The second explanation involves the incentives of local officials in China. In the promotion tournament, higher levels of government generally use the planning and construction of MTIPs as an indicator to measure the performance of local officials. Moreover, MTIPs also generate local economic development and impressive fiscal revenue. Therefore, local officials are motivated to promote the progress of MTIP planning, even giving rise to the phenomenon of constructing before approval.

The shortcomings of the hierarchic planning mode in China are also obvious, *i.e.*, the high *ex post* costs. In the HGH case specifically, they include (1) the intense conflicts of interest around issues, such as land expropriation compensation; and (2) the underestimation of the negative consequences of environmental impacts in the planning process. In addition to limited public participation, there are three other factors resulting in *ex post* inefficiency. Firstly, the flawed land expropriation system in China directly affects the interests of land-expropriated farmers in the context of MTIPs. According to Article 47 of the Land Administration Law, the expropriation of farmland is compensated based on the original land use, and the sum of the land compensation fee and the resettlement fee cannot exceed 30 times the average output value of the land over three years. Obviously, due to the low compensation standards, it is difficult for expropriated farmers to maintain their previous living standards. This generates farmer dissatisfaction with the land compensation and easily leads to land conflicts with government. Secondly, because the court system in China is not independent, the interests of affected individuals cannot be protected. In China, farmers are unable to oppose project construction and appeal land expropriation by the local government to the courts [22]. Given the lack of judicial channels, the local government, which has a strong position in land expropriation, may abuse its public planning power, resulting in further accumulation and intensification of land conflicts. Thirdly, environmental protection in China is relatively backward. For a long time, in order to develop the economy, the local government has paid less attention to EIA and impact mitigation measures. Moreover, the current system of environmental impact assessment lacks *ex post* supervision and tracking of mitigation measures.

The pros and cons of Germany's democratic participatory mode are just the opposite of those in China. Specifically, the shortcomings of the democratic participatory mode are high *ex ante* costs with time-consuming planning and budget overruns, while the strengths of this mode are *ex post* cost savings, making the whole planning process more open and the conflicts of interest among different parties more avoidable. Regarding the problem of budget overruns in MTIP planning, the existing literature generally focuses on technical, psychological, and political explanations [10]. Taking the political factor as an example, as confirmed in the BER case in Germany, in order for the project proposal to pass in parliament, the optimistic government tends to exaggerate the social and economic benefits and deliberately underestimate the budget of MTIPs, resulting in overruns in the case of BER. However, we also find that the complicated procedures, extensive public participation, and tug-of-war appeals are important reasons for the long planning period. In the BER case, public participation did not necessarily ease or accelerate the planning process, but also did not fundamentally change the planning decisions (*e.g.*, site selection). Because approval of the local government's planning decisions required final ruling by the court system, the cumbersome legal proceedings extended the planning cycle. A recent study showed that the average MTIP planning period in Germany is 12–20 years [26], and this disadvantage may weaken the competitiveness of MTIPs in the global market.

Regarding the ex post cost savings of Germany's MTIP planning, in addition to the extensive public participation increasing the transparency of the planning process, we also highlight the following factors. First, as basic assets of MTIP planning in Germany, democracy and the rule of law fully protect the rights of affected individuals, reducing the likelihood of conflicts of interest after planning approval. Given the system of private property rights, land expropriation in Germany is compensated according to the market price. However, in case of BER, it is to emphasize that land property could be acquired and the instrument of expropriation was not needed. Through equal negotiations, land owners can obtain satisfactory compensation outcomes. Furthermore, independent courts provide a final safeguard protecting the rights of the affected stakeholders. Second, given the planning goal of harmony between man and nature, the planning mode in Germany pays more attention to environmental protection in the context of MTIPs, thus decreasing the risk of ex post remediation of environmental impacts.

6. Conclusions

This paper developed an analytical framework for comparing the hierarchic mode of MTIP planning in China and the democratic participatory mode of MTIP planning in Germany. Focusing on planning goals and planning processes, the governance structures of planning practices in China and Germany were described in detail. Based on two airport cases, the comparison emphasized the MTIP planning process of two modes, i.e., preparation, review, coordination, final review stages, and the planning performance in terms of ex ante and ex post costs. Furthermore, the differences in values underlying planning goals, the differences in governance characteristics, and the reasons underlying the pros and cons of each planning mode were also discussed.

Based on the model description and the comparison of airport cases, this paper finds that, due to values prioritizing efficiency, the ecological impact of MTIPs is intentionally neglected in favor of investment and economic development in China. A government-led hierarchic planning mode involving limited public participation is adopted by the Chinese government. Although the ex ante costs of MTIP planning are effectively economized, the high ex post costs (e.g., land expropriation conflicts) have become a concern. In contrast to China, Germany prioritizes social justice and aims to achieve the goals of revitalization and social harmony. Strategies including extensive public participation, planning formulation emphasizing environmental impact mitigation, decentralization of planning approval, coordination and balancing of interests by independent courts have thus been adopted by the German government and have become main elements of their democratic participatory planning. In this planning mode, the ex post costs of MTIP planning (e.g., land compensation) are economized; however, the ex ante costs, especially the timing cost, due to the complicated procedures and extensive public participation, cannot be ignored.

Based on the comparison in this paper, the main conclusions that can be drawn are as follows:

- (1) The analytical framework presented in this paper provided an appropriate standard for describing and comparing MTIP planning modes, and the evaluation criteria consisting of ex ante and ex post costs constitutes the core of this framework. Through this comparative analysis, policy makers can clearly understand the pros and cons of different planning modes, and this knowledge may be instructive for further reform in their countries.
- (2) The planning modes in China and Germany each have their own strengths and weaknesses, which means that there is a trade-off between ex ante and ex post costs in the choice of governance structures. A comparison of airport cases from two countries showed that hierarchic planning was better than democratic participatory planning in terms of ex ante cost savings, while it did not seem to be as effective as democratic participatory planning in terms of ex post cost savings. Given the different socio-economic backgrounds of China and Germany, we can better understand the meaning of the trade-offs.

- (3) The comparative study in this paper can provide valuable experience for China and Germany to improve their respective planning performance. With the development of ecological consciousness and civil society, the Chinese government will pay more attention to environmental protection and the opinions of citizens in planning for MTIPs in the future, and it is worth learning from Germany's practices that focus on ecological concerns and public participation. If the German government wants to improve the efficiency of project planning by shortening the planning cycle, appropriately strengthening governmental planning power with reference to China's experience may be a favorable approach. In addition, this paper's detailed descriptions of MTIP planning in China and Germany may also be helpful to other countries.

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