

Exploration on the Construction and Application of Big Data Investment Promotion Platform

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Abstract. At present, the integration of new technology clusters represented by cloud computing, big data, Internet of Things, artificial intelligence, and 5G has undoubtedly provided new ideas for investment promotion in various regions, and the investment promotion mode supported by big data has become the "new favorite" of local governments to attract investment. The investment promotion model supported by big data has become the "new favorite" of local governments to attract investment. This investment promotion model is based on the whole scenario of investment promotion business, comprehensively solving the problems faced by local investment promotion work at this stage and promoting local investment promotion work into the intelligent era. This paper introduces the construction structure of the big data investment promotion platform, compares the current situation of the application of the big data investment promotion platform, and finally provides an outlook on the future development trend and constructively proposes three new initiatives, aiming to form a new mechanism of "government coordination and promotion, platform tracking services, and market-oriented operation and management" for intelligent investment promotion.

Key words: big data investment promotion platform; investment promotion; local economy; construction; application.

1. Introduction

With the growing maturity of Internet information technology, it is an inevitable trend to carry out intelligent investment promotion with the help of big data platform to achieve the accuracy and effectiveness of investment promotion. From the macro level, big data investment is not only the main way to form a feedback economic system and promote supply-side reform, but also the necessary means to build industrial clusters and accelerate the construction of industrial chains; from the micro level, big data investment can assist in the establishment of personalized investment work, so that the government and the project, capital, talent, market to achieve a seamless connection, greatly improving the conversion rate of investment attraction on the ground.

As an effective means to alleviate the drawbacks of traditional investment promotion work, big data investment promotion has, to a certain extent, solved the problems of poor capital flow and uneven resource allocation in various provinces and cities across the country. In order to better promote the flow of investment information and realize the sharing of investment resources, the future platform will also be more across application scenarios, and constantly expand and innovate functional applications to make investment leads more accurate, investment decisions more intelligent, investment services more intelligent, and investment work more efficient.

2. Big Data Investment Promotion Platform Construction Architecture

According to the flow of data, the big data investment promotion platform can be divided into three construction levels - Infrastructure Construction Layer, Integrated-Treatment Layer and the management applying layer (see Figure 1). The basic construction layer mainly involves data collection and data classification, and the investment database formed by this process will serve as a data source for subsequent investment applications; Integrated-Treatment Layer is based on database and artificial intelligence technology, which deeply digs the effective information of investment projects and provides professional decision support for accurate investment; the management applying layer uses digital means to realize real-time follow-up, dynamic tracking, and whole process

for the whole life cycle of various projects. The management applying layer uses digital means to realize real-time follow-up, dynamic tracking, and full supervision for the whole life cycle of various projects, providing new carriers and new kinetic energy for digital investment.

2.1 Infrastructure Construction Layer: Establishing Data Collection System

By establishing a data collection system, the platform uses technical means such as web crawlers or public APIs of websites to obtain investment data from major network platforms such as investment information network, enterprise information network, national policy public network, etc. After classifying and summarizing the information, it is stored in different tag libraries, such as enterprise/industry information library, target customer library, investment project library, policy database, etc., in order to achieve accurate collection, unified management and timely provision of relevant data. At the same time, the platform carries out real-time collection, processing and transmission for incremental data and batch data in the website through the built-in data transmission system, similar to Flume and OGG systems, to ensure real-time update of investment promotion data.

2.2 Integrated-Treatment Layer: Deep Data Mining

The original data in the data collection system, after a series of data pre-processing such as auditing, screening, cleaning, sorting, etc., flows into the integrated-treatment layer, using AI technologies such as natural language processing, knowledge evolution and reasoning, intelligent description and generation, etc. to take investment data as the calculation object, dig and sort out the effective key elements of the data, identify and discover the effective correlation information of the data, and further form the regional portrait, enterprise portrait, Industry mapping, investment heat map, etc., so that the massive data can generate more business value. For example, after importing the effective data into the model library, the system can automatically complete the establishment and analysis of the model according to the characteristics of the problem, and obtain the information support and analysis report for the required decision in the shortest time, so as to dig out the target enterprises suitable for the leading investment industries in the region. It is usually used as the data support for the application modules on the upper layer of the platform such as pre-invitation evaluation and market forecast.

2.3 Management Applying Layer: Building Data Application Module

After data mining and analysis, the obtained project model evaluation report and investment promotion analysis report will help the management applying layer to carry out investment promotion services. The big data investment promotion platform provides services in the form of SaaS or PaaS, and adopts a unified service model with multiple ends such as small program, cell phone end and PC end, which is convenient for customers to use [1].

The data management applying layer aggregates investment management work into a one-stop platform, and synchronizes multi-dimensional to realize the whole process management activities of pre-invitation evaluation, project landing and post-invitation supervision. The platform not only includes investment resource management, investment project management, investment data management and other basic management operation and maintenance work, but also integrates the office, attendance and performance management of investment personnel, improves the traditional government management path, visualizes investment work data, and significantly improves investment efficiency.

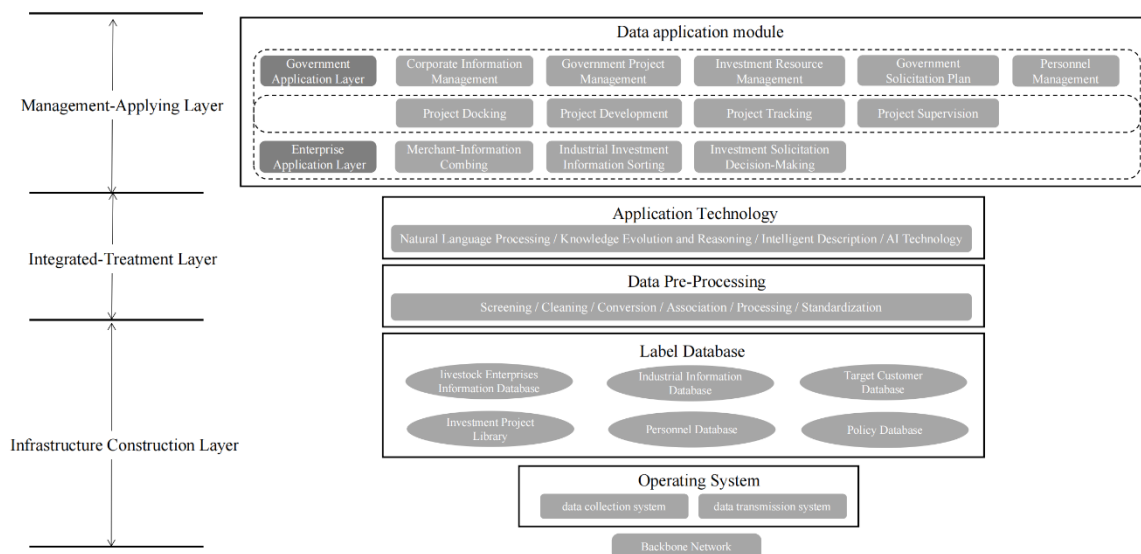


Figure 1. Big Data Investment Promotion Platform Construction Architecture Diagram

3. The Effectiveness of the Construction of Big Data Investment Promotion Platform

Big data investment promotion refers to a new investment promotion mode that relies on big data and artificial intelligence technology to assist local governments in improving the effectiveness of investment promotion. Through the construction of big data investment promotion platform (see Figure 2), the vertical integration of investment work, horizontal collaboration, process standardization, data visualization, the formation of "government coordination and promotion, platform tracking services, market operation and management" of the new mechanism of intelligent investment.

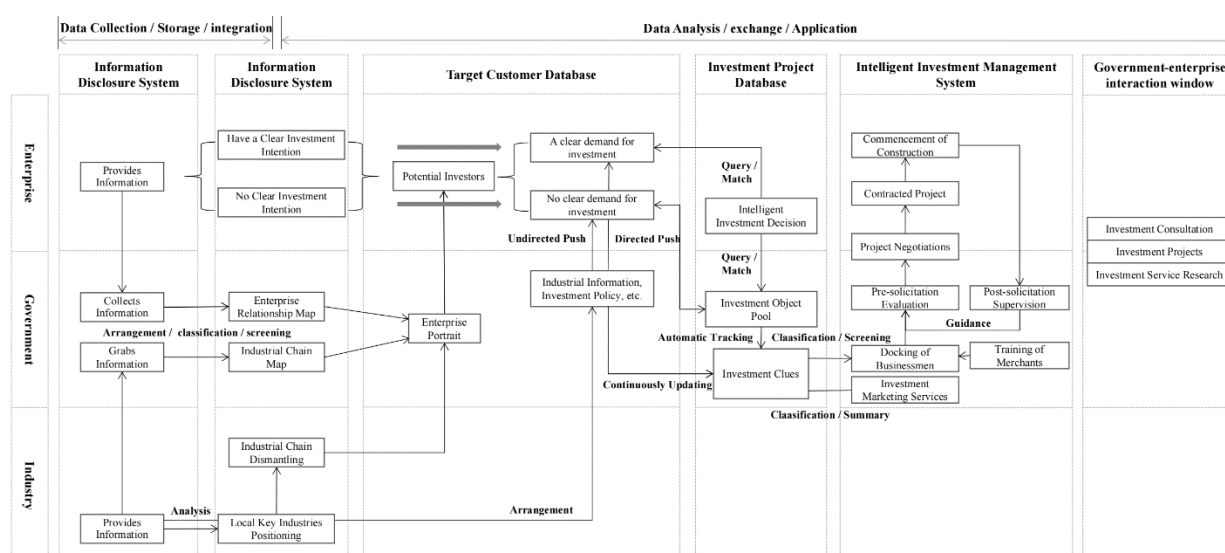


Figure 2. Framework System of Big Data Investment Promotion Platform

3.1 Government Office Side: Effectively Improving the Efficiency of Investment Promotion

3.1.1 Increasing attraction power: provide convenience for investment attraction

In order to better access the investment resources of each region, the preliminary big data investment promotion platform obtains the basic information and extended information of enterprises

and industries from the network information public system, and then organizes them into the enterprise information database and industry information database. In the industrial information database, the platform analyzes the local key industry positioning based on various information resources such as resource advantages of each region's industrial chain, production factor matching, distribution of related enterprises, market trends and potentials, etc., builds a full range of industrial chain mapping, correlates project types with industrial chains, and carries out project sub-stacking, so that the government can query the dynamic data of the whole industrial chain in a more targeted manner; while in the enterprise information database, the platform analyzes the local key industry positioning based on the panoramic In the enterprise information database, the platform constructs the enterprise relationship map based on the panoramic information, operation management status and operation mode, looks for the path correlation between enterprises, combines the distribution of enterprises in the industry chain map for the precise "portrait" of enterprises, helps the government screen out potential investment objects that meet investment standards and have investment intentions, forms a target customer database, and provides investment leads for later deep excavation.

3.1.2 Strengthen internal strength: provide assistance for investment promotion work

In order to solve the problems of small volume and low quality of projects during the traditional investment promotion period, the platform plans investment promotion projects in line with the current industrial trends and regional economy according to the direction of local key industries. It not only provides directional guidance for the government's investment attraction, but also provides important reference for enterprises to understand the actual investment direction of the government. Through the construction of the investment project database, we not only screen, evaluate, organize and classify the projects to realize centralized, process-oriented and convenient management of project resources, but also evaluate the information from various aspects such as environment, technology and socio-economic benefits involved in the projects to determine the feasibility and investment value of the project investment and enhance the quality and effectiveness of the government's investment attraction.

After the enterprises in the target customer pool are screened, they flow into the pool of investment objects in the project pool. The platform relies on the existing investment data to formulate investment marketing strategies for the government, so as to realize the accurate matching between enterprises and projects. On the other hand, past investment cases are correlated and investigated to dig out valuable investment leads. The clues are sorted and screened and sent to the investment docking personnel, so that they can fully grasp the investment information and understand the project policy conditions and advantages, thus improving the investment efficiency of the local government.

3.1.3 Convergence: provide guarantee for investment attraction work

Through the intelligent investment management system integrating "platform construction, system support and operation management", the project management problem of investment attraction is solved and the quality and efficiency of project management is improved. In the project docking stage, the government carries out investment project negotiation and investment contract signing through the platform; in the project development stage, the platform relies on the Internet, big data and intelligent statistical algorithm to timely find and solve enterprise problems, complete service acceptance, service tracking, service feedback, effectiveness control, process records, and information sharing, forming a "corporate demand Service personnel centralized acceptance - platform continuous tracking" of enterprise service mechanism, to ensure that the information is uploaded; in the project supervision stage, the platform for the whole life cycle of the project, real-time statistical analysis of project information, dynamic tracking records of business conditions, and generate the corresponding report, to support In the project supervision stage, the platform provides real-time statistical analysis of project information for the whole life cycle of the project, and generates corresponding reports to support the scheduling and supervision of investment projects by the government, and creates a management system of enterprise service butler, self-trending business environment, digital service management and transparent improvement results. In addition, the

government-enterprise interactive window is embedded in it, including three major windows for investment advisory, investment project processing and investment service research, to realize interactive functions such as online consultation and service feedback optimization, and further improve the business level of investment attraction. In the investment service research, the government will gain an in-depth understanding of the progress of the project, the development of enterprises and the various problems encountered in the process of landing, retrain investment personnel based on the results of the research, and strengthen the responsibility of a sound mechanism for the performance of investment personnel to conduct a comprehensive assessment and scoring to provide a solid guarantee for the quality of investment projects.

3.2 Enterprise Service Side: Efficient Business Activities

3.2.1 Broaden the channel: broaden the access to investment information resources of enterprises

In the pre-investment stage of enterprises, through applications such as regional economic analysis, industrial mapping and investment policy pushing, the big data investment promotion platform will integrate, count and analyze the collected industrial planning, government policies and other investment information resources to help enterprises locate investment landing points more accurately. Enterprises can also consult on investment matters on the government-enterprise interactive window to understand the development prospects and investment value of the project, the business environment of the region, the state of the regional industry, etc. In practice, it is often difficult for enterprises to conduct in-depth field inspections due to the limitations of geographic location, traffic conditions, technology and other factors, and they cannot truly understand the scale of industrial land, the layout of related enterprises and the surrounding supporting facilities in the investment area. Within the spatial layout map, to help enterprises fully understand the project information and regional industrial advantages.

3.2.2 Support decision-making: assist enterprises in investment project investment decision analysis

In the project matching stage, the big data investment promotion platform analyzes the resource advantages and policy dividends of the investment industry, and through the intelligent investment decision application, the Internet big data "collection + data" mining, "industrial development + government policies + location characteristics" as the core, combined with the enterprise's own advantages of intelligent matching quality projects, under the premise of ensuring the scientific and reasonable project planning and capital budget, to give investment decision recommendations to assist enterprises to make investment decisions.

3.2.3 Help to carry out: help enterprises to carry out investment projects to land and run

In the post-invitation supervision stage, enterprises use the platform to support the task reminder, overdue warning and other functions, you can achieve real-time tracking and supervision of project construction to ensure the smooth implementation of the project. Meanwhile, the investment project processing function in the government-enterprise interaction window not only integrates the original fragmented and decentralized government services [2], but also connects the platform with the ports of various government departments, effectively solving the investment problems of multi-point application and decentralized acceptance, allowing more information to run online and less horse-riding for enterprises, and realizing the "one-stop processing" of investment business.

4. Prospect of Big Data Investment Promotion Platform Construction

With the in-depth implementation of the overall strategy of regional development, the differentiation of China's regional economic development has intensified, and strategic emerging industries have become an important support for sustained regional economic growth. As the "tractor" and "power source" of economic development, investment promotion and investment promotion will

also continue to contribute to high-quality economic development. In the future, investment promotion will change the traditional thinking, optimize the investment environment for foreign investors, and provide good conditions and reliable protection for foreign investors. At the same time, the deployment of the construction of a modern industrial system, accelerate the development of strategic emerging industries, and drive the development of key industrial clusters and regional differentiation. In addition, it will also coordinate the construction of a national integrated investment network, adjust and optimize the industrial layout of regional investment, accelerate the implementation of regional coordinated development strategies, and create a new pattern of "sharing - win-win - co-creation" of investment attraction.

4.1 High Level of Sound Foreign Investment Service System

4.1.1 Introduction of Foreign Investment

In recent years, China's foreign investment management system has undergone significant reforms, especially the Law of the People's Republic of China on Foreign Investment, which has been in force since 2020, formally establishes the pre-entry national treatment plus negative list management system for foreign investment at the legal level and establishes a foreign investment information reporting system [3]. This institutional innovation not only helps to create a fair competitive market environment for domestic and foreign investors and strengthen the protection of the legitimate rights and interests of foreign investors, but also enhances foreign investors' expectations of the stability of China's future institutional environment. on January 1, 2022, the 2022 version of the negative list for foreign investment access was officially implemented, further expanding the opening up in manufacturing and service sectors and further enhancing the facilitation of foreign investment. On the same day, the RCEP agreement also came into force, allowing all kinds of enterprises, including foreign enterprises, to enjoy more opportunities and openness dividends. In the past, the government has always insisted on attracting investment as the "No. 1 project" for economic development, and has set up new and additional comprehensive service policies, fiscal and financial policies, and industrial policies with a view to continuously easing foreign investment access. In order to give full play to the advantageous role of finance in helping to attract investment and make financial development and investment complement each other, local governments have creatively put forward the concept of finance first in attracting investment, such as building regional financial service centers and setting up industrial guidance funds, as well as attracting more foreign financial institutions to set up business centers and functional headquarters in China, helping foreign-funded enterprises to effectively solve financing problems and effectively driving financial This has helped foreign investors to solve their financing problems and effectively promoted the development of foreign investment in the country by attracting foreign investors to propose capital increase and reinvestment with the effectiveness of major projects.

4.1.2 Investment protection

In the process of investment, foreign enterprises often suffer from different degrees of risks, such as legal litigation risk, policy change risk, investment environment risk, business model risk, investment exit risk, exchange rate risk, etc. Most enterprises lack effective risk assessment, control and management of their investment projects, which makes it very easy for foreign investment to fall into a blind and disorderly state. The government has the responsibility to supervise the progress of the project according to the law, and the enterprises have the obligation to keep abreast of the progress of the project. The big data investment promotion platform should, on the one hand, ensure the legal disclosure of project information, and on the other hand, refine the specific process of the project and specify the responsible subjects of project activities. Incorporate the problem trail management, online verification and evidence collection, rectification tracking, asset loss and loss risk monitoring into the information system, and do a good job of docking with other business information of enterprises to strengthen the timely detection and effective disposal of irregularities and foreign-related commercial disputes, so as to protect the domestic investment of foreign-invested enterprises

by means of information technology. For example, Shanghai Pudong New Area Court has further explored the construction of a "one-stop settlement mechanism for foreign-related commercial disputes" on the basis of the multiple settlement mechanism for commercial disputes. The big data investment promotion platform will fully utilize the construction achievements of the wisdom court [4], and complete the case data collection and the follow-up work of "introduction, investigation, filing, trial, execution and service" with the help of emerging technologies such as big data, block chain and cloud computing, so as to realize one-stop and one-network litigation services and provide convenient judicial services for optimizing the business environment of foreign investment under the rule of law. Provide convenient judicial services.

The platform will also add personnel management and performance assessment functions, and administrators of competent departments at all levels can realize personnel adjustment in the project activity process through the platform, such as editing departmental personnel accounts, authorizing personnel and other operations, so as to facilitate real-time understanding of the project implementation progress and responsible subjects, to achieve cooperation among various departments, to strengthen project tracking and implementation and performance evaluation mechanism, and to incorporate the main responsibility of foreign investment investment into the performance assessment content, so as to further improve the transparency of government work.

4.2 High-Quality Construction of Modern Industrial System

The Fifth Plenary Session of the 19th Party Congress clearly put forward "accelerate the development of modern industrial system and promote the optimization and upgrading of the economic system", which is based on the new requirements for the new environment faced by industrial operation after China entered a new stage of development. Big data investment promotion platform will implement the development strategy of big data intelligence, focus on "three big and three new", namely, big health, big data, big logistics, new manufacturing, new materials, new energy six key industrial fields, to provide relevant enterprises with policy information, investment information, investment decisions and other systematic solutions [5]. By analyzing the current situation of industries and enterprises to help enterprises predict the future development trend, clarify the current industrial path, screen out suitable investment projects, promote the optimization and adjustment of industrial structure around the region, and promote the coordinated development of regional industries. Taking new energy vehicles as an example, based on the relatively mature and complete auto industry chain in the Yangtze River Delta region, the platform conducts research and evaluation on industry trends, technology development, industrial policies, and investment site selection, and keenly captures the promising market of new energy vehicles. For example, in Lishui, Nanjing, the big data investment promotion platform has built a whole industry chain system integrating R&D and design, vehicle manufacturing, power battery and other core components [6], professional track testing and high-end technology services with new energy vehicles as the core industry direction, and built the place into a national and innovative new energy vehicle industry highland [7].

4.3 Building an All-Round Integrated Regional Investment Network

Through the tier capital inflow and outflow model (see Figure 3), it can be seen that there is an obvious tier-like distribution among the provinces and cities in the country, which are the first tier (economically developed regions), the second tier (regions with relatively good economic development) and the third tier (regions with relatively backward economic development levels).

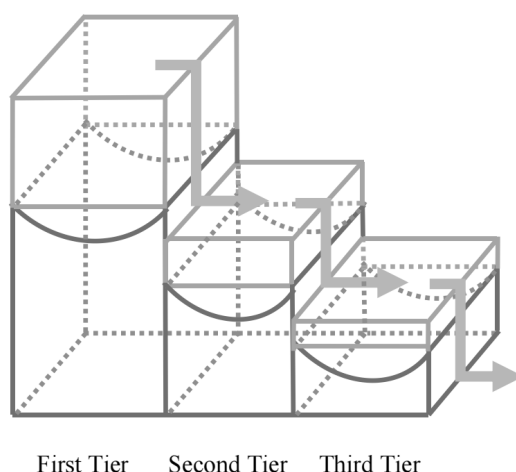


Figure 3. Tier Capital Inflow and Outflow Model

The model involves two major capital cycles. Firstly, capital flows into and out of each other between different regions within each echelon, i.e. capital circulation within the echelon (see Figure 3-1). Secondly, the capital flow between different echelons to achieve the rational allocation and optimal use of resources, i.e., the capital outward circulation (see Figure 3-2). Usually the first echelon net capital output is more normal, because the development of local enterprises in the first echelon is mature, in the process of further growth of enterprises towards the national market natural foreign export investment; the second echelon net capital input is more normal, because the comprehensive strength and investment capacity of local enterprises is not strong enough, and the local is in the key stage of vigorous investment; and the third echelon because the local economic development level is relatively backward, investment The third tier tends to show a net export of capital (see Figure 3-3) because the local economic development level is relatively backward, the investment environment is average and attracts less investment, which leads to a large amount of local capital outflow. A comprehensive observation of the inflow and outflow of industrial capital in each province reveals that capital does not flow significantly to places with lower factor costs, but to investment depressions with better comprehensive investment environment, better industrial base and greater market opportunities. After the investment puddle of that tier is filled by capital, capital will overflow and turn to the investment puddle of the next tier (hereinafter referred to as InvD). Therefore, in order to better promote the flow of capital between provinces and cities, the future platform will build a national regional integrated investment network, let big data become a "powerful engine" to attract investment, break the administrative restrictions in investment, integrate the investment resources of the national industrial chain, so that the flow of data drives the flow of capital, thus creating greater value. In the process of capital flow, it not only drives social employment, population flow and technological innovation, but also accelerates the transformation and upgrading of industrial structure, realizes the optimization of resource allocation, makes the industry move to a larger scale and higher level, and comprehensively promotes the high-quality development of regional economy.

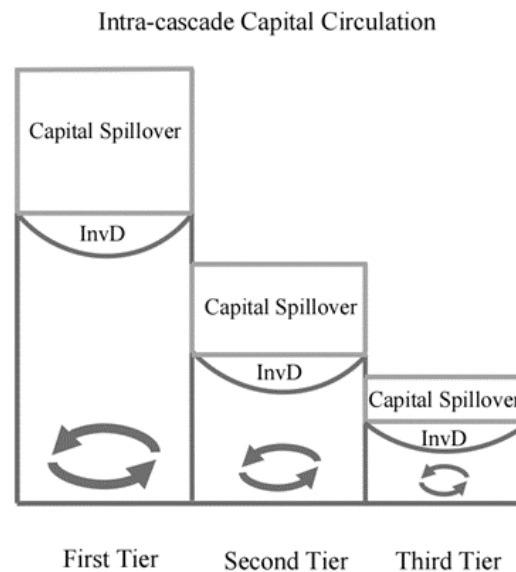


Figure 4. Tier Capital Inflow and Outflow Model Diagram - Front View

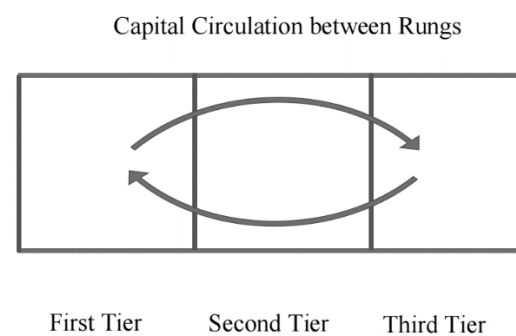


Figure 5. Tier Capital Inflow and Outflow Model-Top View

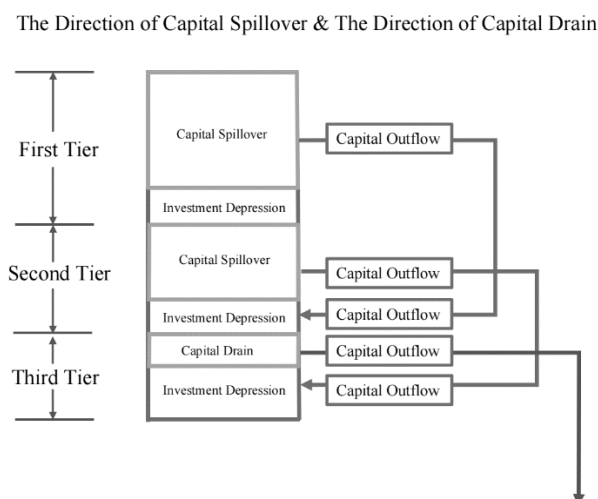


Figure 6. Tier Capital Inflow and Outflow Model - Side View

Compared with the provincial investment promotion platform built by each province, the special feature of the national integrated investment promotion network is that the sharing of investment promotion resources across provinces drives the high-quality development of investment promotion, breaks the geographical boundaries and optimizes the inter-regional resources. The platform will break geographical boundaries, optimize resource allocation between regions and deepen cross-regional innovation cooperation. The platform will plan to build a national information resource

sharing system so that the government and enterprises can quickly inquire about project and industry information and share information resources. In addition, it will also conduct multi-dimensional qualification review of enterprises, anti-screening to identify target enterprises and improve the quality of investment attraction. In order to respond to the call of national security management and guarantee the smooth landing of projects. The platform will focus on the emergency response mechanism of construction projects in order to enhance the government's disposal capability when encountering various emergency events in project implementation.

The national information resource sharing system is a project tracking management system that takes national investment resources as the core, runs vertically through the provincial, municipal and county (district) levels, and connects project authorities at all levels horizontally. The system will unify project coding standards, project information standards, and investment project databases, and share information on clients and investment projects on the basis of forming standardized business processes and standardized project contents to promote investment projects across regions and deep industries.

Although some regions have introduced many foreign enterprises, there are still many problems, such as the optimal combination of newly introduced projects and existing industrial structure can not be achieved, which is not conducive to leading the development of industrial clusters; too much attention is paid to the number of introduced enterprises, ignoring the quality of enterprises and follow-up services, resulting in fewer projects landing; the institutional mechanism of investment promotion innovation and reform is not strong enough, which is not conducive to the introduction of high growth innovative enterprises. Therefore, in the anti-screening enterprise link, the platform will break the traditional investor-selected project model and adopt the project anti-screening to determine the enterprise, relying on the National Enterprise Credit Public Information System, China Judgment Document Network, China Execution Information Public Network, and the Credit Center of the People's Bank of China to integrate the relevant information of the enterprises willing to invest nationwide, and target the total amount of tax payment, corporate credit, total assets, whether the enterprise is In this way, we can scientifically and efficiently determine the project investors by judging the main qualification and performance capability of the investors. In this way, it not only avoids secondary filing, but also greatly saves government resources and improves the efficiency of investment work.

And in the project development and implementation stage, some places emphasize benefits over safety, thus leading to accidents. The disposal of emergency events involves three aspects: pre-monitoring and early warning, emergency management, and post-reconstruction. Among them, pre-monitoring and early warning is mainly to carry out continuous detection of the project process, to predict and warn the possibility of emergencies, project managers at all levels based on the platform on all kinds of hidden dangers and corresponding weak links established by the hidden files to conduct regular checks, optimize emergency measures, to achieve a combination of prevention and emergency management, to a certain extent, to provide more comprehensive protection for the project, to further enhance the government The emergency management includes project risk reporting, plan activation, resource deployment and emergency rescue. The platform will establish a project emergency plan library by classifying and filing the plans of provinces, cities and districts, so that once an emergency occurs, the management personnel can filter out the reference plans through the project emergency plan library to help the government and enterprises solve problems and improve their comprehensive ability to deal with emergencies; the post-event recovery and reconstruction mainly involves the investigation and evaluation of accident hazards and repair and recovery work, and the platform will link up with the emergency management departments with the help of electronic forms Quickly summarize the emergency events reported by each jurisdiction in the system, the responsible subjects and implementation contents of each stage of project construction, forming an electronic information board to help government management departments at all levels understand the event situation in real time and provide clue tracing support for the government to clarify responsibility.

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