Research on Immigration Management Information Work From the Perspective of Big Data

Wei Cai[a,*], Jian Qu, Benzhuo Guo

China People's Police University, Langfang, Hebei, 065000, China

[a] ssgxgx@163.com

*corresponding author

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Abstract: In view of the problems of limited comprehensive application ability of data resources, insufficient space information resources and mobile applications in China's immigration informatization, the new generation of information technology, such as Internet of things, cloud computing, big data, and spatial geographic information, is used to build a comprehensive system of intelligent immigration informatization, so as to adapt to the new situation and new requirements of hydropower project immigration management. This paper introduces the system construction objectives, application scope, intelligent immigration logical architecture design, function planning, immigration spatial information resource construction, etc. The construction and application of the system will further promote the intelligence of migration work, improve the efficiency and management level of migration work, ensure the long-term stability and sustainable development of the reservoir area immigrants, and further improve China's scientific and technological innovation ability and the core competitiveness of the migration industry.

1. Research Background

Hydropower is an important part of renewable energy system, and it is also the most mature and economical renewable energy at present. The development of large-scale hydropower project is an activity for human beings to transform nature and utilize water resources, involving many complex factors such as natural environment, engineering technology, economy, society, resettlement, etc., which can be called the most challenging human engineering activity[1]. For a long time, reservoir resettlement is an important part of hydropower projects. Reservoir resettlement is one of the restrictive factors that must be paid attention to in the planning, design and construction of hydropower projects, which is related to project investment scale, regional environmental carrying capacity, social and economic development, social stability and ecological environment protection.

Nowadays, digitalization and intellectualization are the inevitable trend of the development and transformation of global information technology. The CPC Central Committee and the State Council attach great importance to the construction and development of smart society, emphasize the construction of a powerful network, digital China and smart society, and require all industries to strengthen the Internet, big data, artificial intelligence and Deep integration of real economy, etc. Digitalization and intellectualization are also the important work contents of China's 13th five year plan for science and technology and the information plan for the "Three Gorges". For example, in order to improve the construction and operation level of the project, comprehensive utilization of geospatial information technology, Internet of things and other high and new technologies, and the use of the whole life cycle management concept, the digital watershed system is being built to serve the hydropower project. After the concept of smart earth was put forward, "wisdom" replaced "number" and became an omnipotent adjective, such as smart city, smart grid, smart transportation, smart town and smart water conservancy. In particular, the concept of smart city is highly praised by the IT industry, and it technology and application has been widely promoted, which fully improves the urban governance ability and management level. Smart migration is a new migration

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concept and mode integrating Internet of things, cloud computing, big data, spatial geographic information and other technologies, which can promote the resettlement planning and design, project construction, resettlement implementation management, reservoir area assistance and follow-up development of hydropower projects. It further promotes the informatization of migration work, improves the efficiency and management level of migration work, and ensures the migration in the reservoir area Long term stability and sustainable development are of great significance, and will greatly improve China's scientific and technological innovation ability and core competitiveness[2].

2. Construction Objectives and Application Scope

2.1. Construction Objectives

On the basis of the early immigration management informatization, smart immigration aims to integrate the existing immigration related information systems in China, establish a cross departmental data sharing mechanism for the whole business chain, realize the high-level use of data (data collection, processing, storage, cleaning, mining, decision-making control and utilization) around the cooperation of big data, and improve the comprehensive application level of existing systems To achieve the goal of decision support of immigration management and intelligent application of immigration data. To meet the needs of higher immigration management information services, and accurately meet the needs of users at all levels[3], so as to not only provide technical support for ordinary employees in business work, but also provide data support and comparison scheme for leaders' decision-making, such as real-time information push, business process inspection, important affairs supervision, intelligent analysis and decision-making, etc. Through the introduction of spatial information technology, combined with the current big data, cloud computing, Internet + and other concepts, we will fully realize the digitalization of migration work, further promote the deep application and integration of all kinds of data resources, and lay the foundation for the development of China's emigration from management informationization to Digitalization and intelligent development.

Generally speaking, it is to further promote the construction of digital migration based on the existing information-based migration management, and build a comprehensive system of intelligent migration information with the direction of "thorough perception, comprehensive interconnection, deep integration, wide sharing, intelligent application and ubiquitous service", so as to provide effective "intelligent planning, intelligent resettlement, intelligent support and intelligent supervision" Information support. The overall goal framework [4], which can be divided into three levels: intelligent goal, immigration business goal and social responsibility goal.

Intelligent goal

Based on the resettlement management information system of hydropower project, further deepen the application of new generation information technology such as spatial information technology, cloud computing, Internet of things, big data, artificial intelligence, mobile Internet, etc., provide information support for all kinds of immigration work by using information perception, knowledge understanding, auxiliary decision-making and other methods, and strive to improve real-time monitoring, dynamic early warning, intelligent research and judgment, and precise supervision Supervision, long-term tracking, independent evaluation and other aspects of the information level, to promote the transformation of management information to digital, intelligent, to achieve a more comprehensive perception, more active service, more integrated resources, more scientific decision-making, more timely response[5].

Immigration business objectives

We will thoroughly implement the development requirements of the CPC Central Committee and the State Council for building a smart society in the new era, based on the objectives of "three feasibility" of migration management informatization, which are "verifiable migration indicators, traceable migration funds, and evaluable resettlement effects", and in accordance with the objectives of "thorough perception of migration information, accurate grasp of migration situation,

efficient operation of migration planning, in-depth understanding of resettlement laws, and strong guarantee of migration" The goal of "civil rights and benefits, comprehensive promotion of the development of the reservoir area" is to further promote the in-depth integration of all aspects and stages of immigration digitization, intellectualization and immigration work, strive to enhance the handling capacity of supervision, implementation, evaluation and other aspects of immigration work, and promote the overall improvement of the efficiency of intelligent analysis and intelligent decision-making level of immigration management.

Social responsibility objectives

We will comprehensively support China's hydropower sustainable development concept of "building a power station, driving one side's economy, improving one piece of environment and benefiting a group of immigrants", and provide digital and intelligent support for effectively fulfilling the social responsibility of the central enterprise, helping the economic and social sustainable development of the reservoir area, and realizing the coordination and unification of economic, social and ecological benefits.

2.2. Application Scope

The preliminary application scope of the system can cover the current 4 hydropower stations in Jinsha River Basin of China, including Xiangjiaba, Xiluodu, Baihetan, Wudongde, and other water conservancy and hydropower projects at home and abroad, as well as the reservoir area management. The user group can cover the project legal person, the provincial, Prefecture, county (city) level resettlement management agencies[6], relevant government agencies for social and economic development, and immigration regulations Planning design unit, immigration comprehensive supervision unit, construction competent unit and construction unit of various professional projects, as well as immigration, social public and public welfare organizations, environmental protection organizations, etc.

3. Construction Content

From the perspective of information system design and construction, the framework of smart migration can be divided into four layers: information perception layer, network communication layer, computing storage layer and smart application layer. In addition, in addition to the main work of information system research and development, it should also include the construction of four systems: management methods, standards and specifications, safety assurance, operation and maintenance. The main contents of planning and construction for the framework level of smart migration include:

Information perception construction. Realize the overall perception of immigration, immigration engineering and immigration management.

Network communication construction. Considering the needs of real-time transmission, exchange and sharing of all kinds of perceptual data, a high-capacity information channel is constructed by using all kinds of network resources as a whole[7].

Computing storage construction. It covers computing storage layer and fusion support layer. According to the demand for high-performance calculation of migration data, according to the three-level deployment of China, hydropower station / reservoir area, resettlement site and the overall framework of multi-level application of provinces, cities, counties and townships, strengthen the capacity-building of calculation storage, sharing services, command and dispatching, comprehensive consultation, disaster recovery and backup, and build an intensive, unified and public migration big data center.

Smart application construction. By using big data, artificial intelligence and other technologies, an intelligent immigration system with high efficiency, intelligent analysis and real-time convenience is formed.

3.1. Logic Architecture Design

The logical framework of intelligent immigration can be divided into seven parts: user and

terminal layer, application layer, application support layer, information collection and storage layer, information collection layer, security and guarantee environment and operation environment

Information acquisition layer. This layer is the source of all kinds of data of smart immigration.

Information aggregation and storage layer. This layer is an ordered set of data that follows a unified specification. From the perspective of space, it can be divided into two parts: spatial database and non spatial database. According to the characteristics of the data, the spatial database is further divided into national basic spatial data (e.g. government area and boundary, transportation, residential area, terrain, image, etc.), China's basic spatial data (e.g. rivers, lakes, hydropower stations, reservoir area, construction area, etc.), special spatial data of water and electrical engineering migration business (e.g. physical indicators, resettlement planning[8], resettlement implementation, reservoir area assistance, land, etc.) Non spatial database mainly includes the attributes and monitoring information of all kinds of immigration management objects.

Apply the support layer. This layer consists of information service (WS) and platform management (PM).

Information service (WS) can be divided into four categories: presentation service, data service, analysis service and immigration service. Presentation services, that is, graphical presentation services of data. Data services are used for data maintenance and distribution, including directory services, data editing, extraction, distribution, etc. Analysis services for statistical query and spatial analysis of data. Immigration business services are services formed after the combination of the above services and immigration business, such as: inundation impact analysis, relocation and reconstruction project extraction, migration and relocation analysis, etc.

Platform management (PM) is a spatial service management platform based on the first level platform, which provides support for GIS application construction in China, including service management, development management, application management, operation and maintenance management, user management and other functions, as well as secondary development API and SDK.

Application layer. The application layer is the smart immigration application, which is used to display all kinds of spatial information resources in a centralized way. At the same time, it uses spatial information as a clue to aggregate the information of various business systems and realize the comprehensive presentation of business data. With platform management (PM) as the application support, smart immigration has good scalability and focuses on typical applications, service resources, standards, specifications and other relevant documents. It is a window for users to understand platform resources and service capabilities.

User and terminal layer. This layer includes all kinds of users, all levels of users and all kinds of terminal equipment. The main construction content of user and terminal layer is to form a richer service terminal and a wider user group through the construction and promotion of application system, so as to promote the wide and in-depth application of spatial information.

Safety and security environment. The construction and operation of smart migration project relies on China's information security and security environment. The standard specifications of the platform involve data resource standards, application development specifications and operation and maintenance management methods. Under the framework of the standard specification system determined by the top-level design, the construction is carried out by reference, adaptation, self compilation and other methods. Data resource standard is mainly used to standardize data processing, storage and product production, including geographic entity name and coding standard, electronic map data standard, etc.; application development standard specification mainly describes the specifications to be followed for platform based application system development, including API specification, space service management specification, etc.; operation and maintenance management method is mainly used to standardize the operation and management of the platform Including space service maintenance methods, space information resource sharing and use management methods, etc.

Information operation environment. The operation of the platform depends on the information operation environment of China, and needs to supplement the operation environment according to

its own characteristics. It mainly includes basic GIS software and some auxiliary tools developed according to the needs of data production.

3.2. Function Planning

The functions of smart immigration system can be divided into the following four parts.

Intelligent planning mainly includes the calculation of inundation impact range, comparison and selection of water storage schemes, physical index survey, resettlement planning and design, social stability risk prediction and analysis, etc.

Intelligent resettlement mainly includes project progress video monitoring, resettlement implementation management, electronic files, disaster prevention and control, etc.

Smart support mainly includes follow-up assistance, targeted poverty alleviation, e-commerce poverty alleviation, education poverty alleviation, etc.

Smart supervision mainly includes Internet big data monitoring, reservoir area stability maintenance and other aspects.

3.3. Construction of Migration Spatial Information Resources

The spatial information resources of immigrants are complex and have many sources, including the data accumulated in the aerial survey of Jinshajiang reservoir area, the investigation of the physical indicators of immigrants in Xiangjiaba and Xiluodu power stations, the planning and design data of major migration projects, other existing spatial data resources in China, and the free public space data available. Therefore, the integration and construction of the above-mentioned data resources is not only the basis for smart migration, but also an opportunity to promote all kinds of related achievements to the level of smart application and play a comprehensive benefit.

Digitalization of basic spatial information

This work is an important foundation for the digitization and analysis of the follow-up spatial thematic information, but it is necessary to avoid the repeated construction of data, and consider the direct use or transformation of relevant achievements[9]. At the same time, the time node that data can be shared, whether the existing data meet the needs, the way of later collection, update and processing, and the centralized management unit should be clarified.

Digital space thematic information

Based on the digitalization of spatial basic information, in order to meet the system construction

And the pilot application needs to collect 12 types of migration space in the pilot area first

Thematic data, follow-up of other regions or projects can be based on actual needs and circumstances

In addition, the space thematic information is digitized

The capacity is shown in Table 1.

Table 1 Prepare data resource construction and management system

Serial number	Data type	Content
1	Emigration topics	Resettlement houses, land, resettlement sites, reconstruction projects, etc
2	Geology	Landslide mass, collapse mass, debris fluid, etc
3	Water resources	Water intake points such as reservoirs and canals
4	Hydrology	Wharf, high way, bridge, etc
5	Communication line	Communication lines and facilities
6	Transmission line	Transmission lines and facilities, etc
7	Broadcasting line	Broadcasting lines and facilities, etc
8	Resources distribution	Ore, scenic, spot

9	Industrial distribution	Agriculture, forestry, fishery, etc
10	Public service facilities	Educational, medical, postal, cultural, entertainment, facilities, etc

The focus of this part of work is to unify data standards and formulate a cross department, cross region and cross project data (quality, safety, etc.) standard. It is used to standardize personnel management, system management, operation management, data resource management and security, etc. in the process of data resource construction through drafting and issuing data construction and management rules and regulations.

3.4. System Interface

Smart immigration involves the interaction with immigration related business systems, including immigration management information system, digital application system of immigration planning results, China geographic information platform, third-party geographic information service, national support system, targeted poverty alleviation system, etc. At the same time, it also includes the interaction with external data perception, interconnection and intelligent computing systems, services and platforms, such as video monitoring system, third-party intelligent analysis services (such as geological disaster monitoring intelligent early warning model), education platform, employment platform, e-commerce platform, etc. Therefore, at the beginning of carrying out system construction, we should consider as a whole and do a good job in the planning and design of relevant interfaces.

4. Conclusion

The essence of intellectualization is based on informatization and digitalization, but it is higher than both. It is the effective continuation and essence promotion of management informatization. Since IBM put forward the concept of intelligent earth, intelligent has been highly praised by the information industry. The construction mode led by information thinking once occupied a dominant position, but also exposed some problems, such as the problem of separating from the actual demand, application distortion, etc., mainly due to the lack of systematic understanding and top-level design of intelligent earth. Therefore, if we want to carry out the construction of smart immigration, we should adhere to the principle of people-centered. First, we should do a good job in top-level design and planning, and realize the organic combination of bottom-up business design and top-down information design. For China, on the basis of the important achievements and experience in the early stage of immigration management informatization, we can focus on the top-level planning and design from both the technical and management levels, and give full guarantee to the system construction from the aspects of system, technology, data resources, talent team training, etc., reflecting the technical integration, data integration, business integration and cross field, cross region, cross system, cross "Three Integrations and four spans" of the unit. At the same time, plan ahead of time to seamlessly connect with the smart cities, smart towns and related e-government systems that may be built by local governments at all levels in the future, so as to realize the vision of building a good hydropower migration and smart ecosystem in the reservoir area jointly by enterprises and local governments.

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