

Innovation and Implementation Path of Precision Poverty Alleviation Model Based on Big Data

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Abstract: "Precision poverty alleviation" is a key measure to continue addressing relative poverty and narrowing regional disparities. The use of big data thinking and technology to support the implementation of "precision poverty alleviation" has become a hot topic in academic research and a key focus of government-related management departments. Building on a systematic review of previous research on relevant issues, this article enriches and improves the mechanism of big data support for "precision poverty alleviation" from the perspectives of identifying impoverished households and poverty alleviation models. Drawing on commonly used Critical Success Factors (CSF) and Strategic Objective Integration and Transformation (SST) methods in enterprise information system planning, the article further refines the innovative model and implementation path of big data-based precision poverty alleviation. It also explores the promotion strategy for the construction of the "precision poverty alleviation" big data management platform, in order to provide useful references and guidance for the work of government-related management departments.

1. Introduction

Currently, precision poverty alleviation is not only a hot topic in theoretical research but also a focus of attention for government agencies. Alongside the rapid development of information technology, the "big data" approach and related methods have become the core of many future problem-solving solutions. In this context, many domestic scholars have explored and studied the support of big data for precision poverty alleviation. For example, Wang Xiaolin investigated the implementation of the multidimensional identification of poverty-stricken populations in Qiannan Prefecture and fully affirmed the support and promotion role of big data in the implementation of precision poverty alleviation^[1]. Yan Junqian, Deng Xiaohai, and others actively explored the support and mechanisms of the Internet of Things, "Internet+", cloud computing, and big data for precision poverty alleviation and fully affirmed the feasibility and reality of big data in supporting precision poverty alleviation^[2]. Wang Lei et al. analyzed the coupling mechanism of the operating mechanism of precision poverty alleviation under big data and its mechanism innovation, revealing the trend of the evolution of the precision poverty alleviation mechanism from government-driven to data-driven^[3]. Zhang Juntao et al. found that building an "Internet+service" information platform, optimizing assistance measures, and enhancing coordination between government departments were important measures to help and support low-income rural families in the post-poverty era^[4].

Currently, relevant research is still limited to the conceptual and theoretical level, and further research is needed on the specific methods and implementation strategies of big data supporting precision poverty alleviation. Therefore, this paper uses the support of relevant theories such as Critical Success Factors (CSF) and Strategic Objective Transformation (SST) to systematically expound the "necessity and challenges of precision poverty alleviation," the "support mechanisms of big data in breaking through the bottleneck of precision poverty alleviation," and the "promotion

strategies for the construction of precision poverty alleviation big data management platform." This paper aims to provide reference for the improvement of poverty alleviation strategies and the continued implementation of precision poverty alleviation policies in the context of China's rural revitalization strategy."

2. Implementation Path of Precision Poverty Alleviation Model with Big Data Support

The steady development of a poverty alleviation big data management platform can effectively support the implementation of precision poverty alleviation through the use of big data technology. The planning, design, and construction of the poverty alleviation big data management platform should place particular emphasis on the design of the database to ensure efficient data collection, storage, updating, analysis, and processing. Furthermore, to better extract the value of the data, the poverty alleviation big data management platform should strive to achieve data and information sharing with other departments such as statistical agencies, public security agencies, and the National Development and Reform Commission. To ensure that big data technology and thinking effectively support the smooth implementation of precision poverty alleviation, it is necessary to clarify the strategy for promoting the construction of the precision poverty alleviation big data management platform.

2.1. Construction of "Precision Poverty Alleviation" Big Data Management Platform through the Comprehensive Application of CSF-SST

John Rockart proposed the Critical Success Factor (CSF) method as one of the information system development planning approaches in 1979. This method involves understanding an enterprise's development strategy and related issues and requirements through communication with senior management and surveys of business executives. It also involves breaking down the enterprise's strategic goals into reasonable and detailed components, thereby identifying the key success factors, as well as the specific indicators related to business, technology, human resources, and finance, necessary for achieving these goals [5-7].

The Strategic Goals Set Transformation (SST) method is another commonly used approach in information management system planning. This method involves converting an enterprise's strategic objectives into information management system goals, as it considers an enterprise's strategic objectives to be composed of strategic information that can be transformed into information management system goals [8, 9]. The logical process of this method is illustrated in Figure 1.

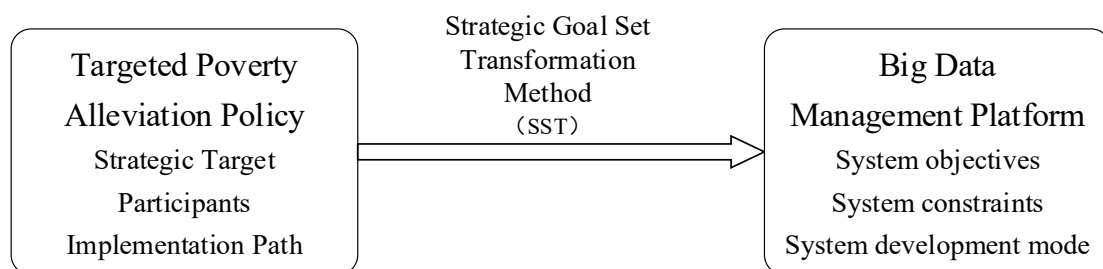


Figure 1 The Logical Diagram of Strategic Goals Set Transformation.

Firstly, the CSF method can be used to determine and refine the government's targeted poverty alleviation strategic objectives. Secondly, the SST method can be applied to transform the strategic objectives into a system strategy for the big data management platform, which includes system objectives, system constraints, and development strategies. The key principles of targeted poverty alleviation are "precise identification, precise assistance, and precise management," with the critical factors for achieving precision lying in four areas: accurate identification of poor households, identification of responsible units (individuals), selection of appropriate assistance models, and feedback of poverty alleviation results.

System constraints encompass three aspects: data sources, development models, and system users. Regarding data sources, the targeted poverty alleviation big data management platform

referred to in this article should be a system that shares data with other departmental information systems. It can be established on the basis of the population census or the public security household registration system, by continuously extracting and accumulating data from existing systems such as the population census or public security household registration, and analyzing and organizing the data according to established rules. In terms of development models, the government has the ability to use advanced hardware facilities and develop supporting software systems with high technical content when constructing data management platforms. However, in the context of the new economic normal, the government needs to prioritize investment returns in system planning and construction, rather than pursuing high performance by adding new hardware equipment or developing specialized software systems. The most appropriate choice should be made between "completely rebuilding" and "improving existing systems" according to the self-strength and development goals of each level of government departments. In terms of system users, it is essential to ensure that poverty alleviation personnel at all levels of government can timely change their thinking and realize that using data information for management and decision-making is an inevitable choice for implementing "targeted poverty alleviation." At the same time, it is necessary to effectively supervise the relevant decision-making personnel to learn how to use modern information technology and make scientifically reasonable decisions with the help of data information provided by the big data management platform.

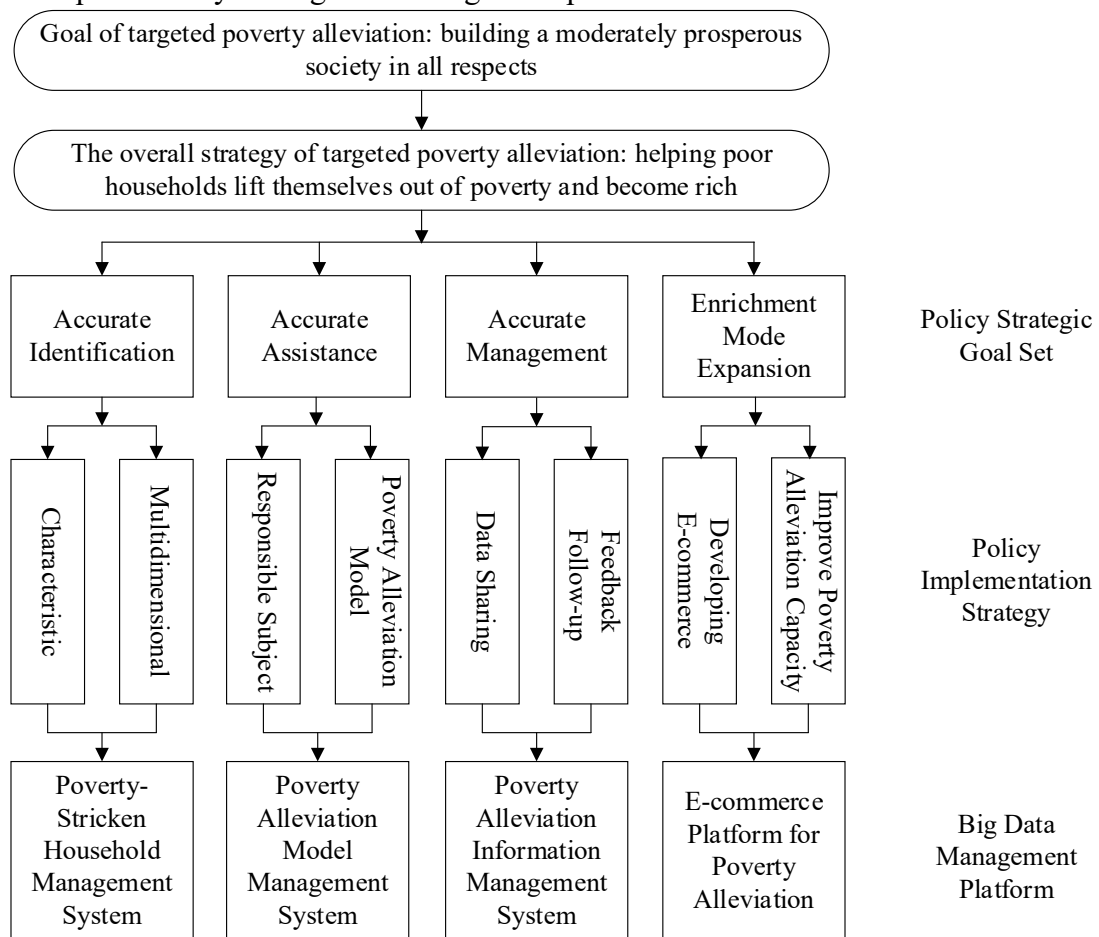


Figure 2 Logical Architecture of the Precision Poverty Alleviation Big Data Management Platform based on SST.

In terms of system design and development, the logical framework for the targeted poverty alleviation big data management platform's initial determination based on the SST method is shown in Figure 2. From the system planning perspective, the planning of the targeted poverty alleviation big data management platform must use appropriate information technology based on full consideration of cost-effectiveness. To ensure smooth data exchange and information sharing, it is necessary to consider establishing technical and data standards that can be used by all relevant

departments. During the development process, special attention should be paid to the system's stability and scalability, with good scalability maintained while the system runs stably on a daily basis. From the management perspective, the construction of the targeted poverty alleviation big data management platform is a systematic project. To prevent confusion in system development and construction work, main efforts should be concentrated on coordinating the plan, execution, and control of the system development project management.

2.2. Exploring and promoting the management system model of "one data center, two service platforms, and four business modules".

2.2.1. "A Data Center"

"A Data Center" refers to the establishment of a precise poverty alleviation big data center at the provincial level. The data center's management authority is divided into different models, including provincial, municipal, county, town, and village levels. Provincial-level officials can access information that supports decision-making, while municipal and county-level officials focus on maintaining natural information data, government information data, and some personal information data shared from other systems. Town and village-level officials are responsible for maintaining some personal information data.

2.2.2. "Two Service Platforms"

"Two Service Platforms" To provide better services to more users, the poverty alleviation big data management platform should include both a mobile and desktop service platform. Both platforms share the same data center.

2.2.3. "Four Business Modules"

"Four Business Modules" refers to the information collection business module, poverty alleviation object and project application business module, poverty alleviation object and project review business module, and poverty alleviation work linkage business module. The information collection business module collects the information needed for precision poverty alleviation based on the national unified data standard. The poverty alleviation object and project application business module supports impoverished households to apply for poverty alleviation assistance and also enables governments and other social organizations to apply for poverty alleviation projects. The poverty alleviation object and project review business module is responsible for reviewing various applications in the application module and providing results. The poverty alleviation work linkage business module realizes data exchange and information sharing between government departments and social forces such as financial institutions, e-commerce companies, and assistance units, expanding the impoverished households' wealth generation modes and effectively providing support to help them out of poverty.

3. Conclusion

China's poverty alleviation efforts have achieved remarkable success, but have now entered a deep reform stage of "tackling tough issues and overcoming difficulties". Faced with the increasingly apparent reality of slower poverty alleviation progress and diminishing marginal returns on resource investment, precision poverty alleviation is the correct direction for poverty alleviation efforts. In the context of the information age, big data thinking and technology are important support for achieving "precise identification," "precise assistance," and "precise management." The comprehensive application of the CSF-SST to construct a "precise poverty alleviation" big data management platform is an effective measure to implement precision poverty alleviation. In order to ensure the comprehensive consolidation and expansion of poverty alleviation achievements, improve the implementation of monitoring and assistance mechanisms to prevent the return to poverty, and ensure that there is no large-scale return to poverty, it is necessary to use big data thinking and technology to promote the construction and improvement of the precise poverty alleviation big data management platform, and take this critical step towards precision poverty

alleviation.

This article only explores the logical structure of the precise poverty alleviation big data management platform in the research process. Further research is needed to determine specific standards for poverty identification and other indicators under this structure. Factors affecting the spatial distribution of poverty alleviation targets and their mechanisms of action will be an important direction for future research.

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