



Research on the Implementation of a Rural Revitalization Project Management Platform in the Tobacco Industry

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Abstract. This study introduces a bespoke cloud-based platform engineered to streamline the administration of rural revitalization endeavors in the tobacco sector. It confronts prevalent issues such as operational inefficiencies and elevated risks linked to these ventures. The platform embraces a comprehensive digital management approach, utilizing a suite of advanced technologies including micro-service frameworks, extensive data analytics, intermediary cloud services, cloud-based data storage, and sophisticated data-driven algorithms. The system facilitates a fully digitized oversight across all stages of a project's lifespan—ranging from the initial application, strategic decision-making, and active execution to real-time tracking, evaluation, and regulatory compliance checks. The inception of this cloud-based infrastructure is anticipated to substantially uplift the efficacy of project management and curtail economic uncertainties, thus bolstering the rural revitalization initiatives.

Keywords: Cloud Technology, Rural Revitalization Projects, Tobacco Industry, Software Architecture

1 Introduction

The initiative "Project Entry into Villages" has emerged as a cornerstone for driving sustainable development in rural territories. Emphasized by the 19th National Congress Report of the Communist Party of China, the critical need to prioritize rural concerns is evident, marking the strategy of rural revitalization as paramount. Industries revitalization remains at the heart of this strategy, with the tobacco industry contributing notably to the agrarian sector's large-scale endeavors[1]. This industry has crafted a distinct development paradigm, instrumental in advancing the broad rural revitalization objectives within tobacco-producing locales.

Recent advancements in the modernization of tobacco agriculture have demonstrated promising outcomes, reflecting the preliminary successes of diverse rural revitalization initiatives. Nevertheless, these initiatives encompass a broad spectrum of fields such as

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agriculture, rural finance, social structure, cultural development, and environmental stewardship. The sustainable support of the tobacco industry for rural rejuvenation hinges on the effective and systematic management of these multifaceted projects[2]. This demands the creation and deployment of specialized information platforms, alongside prudent planning and execution of projects from their inception through to management and assessment phases. Strategic planning and the prudent distribution of resources are imperative to fulfill rural revitalization goals with efficacy.

In light of these considerations, this paper delves into a rural revitalization project spearheaded by the Meizhou Tobacco Monopoly Bureau. It proposes the establishment of a cloud platform specifically engineered to address the unique requisites of rural revitalization projects in the tobacco domain.

2 Current Research Trends

With the adoption of the "Rural Revitalization" strategy [3], the tobacco industry has actively aligned itself with national objectives, undertaking significant efforts in this regard. Dai have proposed various strategies for the tobacco industry's contribution to rural revitalization by examining prevalent challenges in tobacco-growing villages [4]. Yuan has analyzed the distinctiveness and importance of the tobacco industry's involvement in rural revitalization efforts, particularly in poverty alleviation, providing insights into the broader context of poverty alleviation and rural revitalization within the national tobacco sector [2]. Employing Lean Six Sigma's "DMAIC" methodology, they have outlined strategies and measures for the tobacco industry to support rural revitalization initiatives.

Sun in his exploration of rural revitalization project management systems, underscores the necessity of embracing concepts such as "rediscovering paths, resource reorganization, and strategic restructuring" to facilitate networked, human-centered, and intelligent project management [5]. This approach maximizes the efficiency and effectiveness of poverty alleviation initiatives. Tang have developed a comprehensive rural revitalization project management system featuring functionalities like asset distribution, registration, data reporting, auditing, performance monitoring, and statistical analysis [6]. This system enables precise tracking of poverty alleviation asset construction progress, investment returns, changes in households under national poverty alleviation schemes, as well as economic benefits in economically vulnerable and low-income villages. It establishes a novel model of poverty alleviation asset supervision characterized by bidirectional communication, dynamic management, and prompt warnings. Wei advocates for the implementation of such systems to enhance the efficiency of poverty alleviation management within government departments, fortify state-funded project fund oversight, and diminish the risk of corruption and bribery among officials [7].

In recent years, the rapid evolution of 5G networks, IoT technology, and other digital advancements has propelled networking and informatization to the forefront of administrative practices across government departments at various levels. Rural revitalization projects are in dire need of transitioning away from conventional poverty alleviation management methods. While several project information management systems have

been proposed, none have been adequately tailored to integrate with the tobacco industry [8,9], significantly hampering the management and performance evaluation of pertinent rural revitalization endeavors. This paper introduces a digital cloud platform specifically designed for the tobacco industry's rural revitalization projects, with the objective of systematically managing the entire project life cycle. This platform aims to facilitate the implementation and control of project initiation applications, decision-making, execution, dynamic tracking, evaluation, and supervision inspection. Developed in collaboration with the Meizhou Tobacco Monopoly Bureau, this platform will be widely disseminated and applied within the Guangdong tobacco commercial system.

The platform will introduce a comprehensive set of models for assessing project initiation, evaluating project effectiveness, and managing projects and funds throughout the entire process of rural revitalization. Utilizing digital evaluation models, the platform will aid decision-makers in selecting optimal projects, thereby enhancing the scientific and rational implementation of rural revitalization initiatives. By standardizing process management, it will enhance project management efficiency, enabling real-time monitoring of key stages such as project application, decision-making, and execution. This proactive approach will facilitate timely issue resolution, expedite project progress, and ensure effective supervision and evaluation of project advancements and benefits.

3 Designing the Platform

The paper delineates the architecture of a cloud-based platform that is meticulously customized for the enhancement of rural revitalization projects in the tobacco sector. It proposes an integrated "full-process digitization" management paradigm that empowers exhaustive digital oversight across all phases of project execution. This approach guarantees that crucial project metrics such as initiation, allocation of funds, and validation of completion are effortlessly synchronized and updated in real-time. This feature ensures thorough governance over project documentation and related analytical reports.

The platform embodies an innovative framework, sculpted to cater to the distinct demands of the tobacco industry, effectively resolving the managerial challenges encountered in rural revitalization projects within this sphere. By doing so, it presents a transformative model for the administration of such projects, characterized by enhanced efficiency, transparency, and strategic alignment with the objectives of rural development.

3.1 Platform Architecture

Figure 1 outlines the proposed platform's architecture, which is a tailor-made solution utilizing microservices and cloud computing, crafted to elevate the efficiency of rural revitalization projects in the tobacco industry. The platform offers a cloud-based framework that enhances agile development, streamlined deployment, proficient operational management, and continuous service innovation.

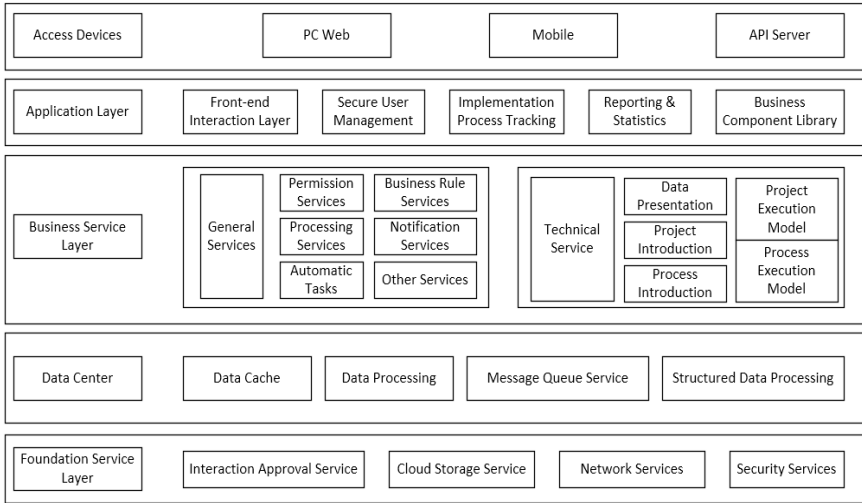


Fig. 1. Platform Architecture

The architecture is a structured, multi-tiered model distinctively segregated into various layers, with each layer dedicated to optimizing a different functionality of the platform's robust framework.

At the apex, the "Access Devices" layer is segmented into PC Web, Mobile, and API Server divisions, representing the diverse access points for stakeholders to interact with the platform. Below this resides the "Application Layer," comprising the "Front-end Interaction Layer" that facilitates user engagement, "Secure User Management" for robust access control, "Implementation Process Tracking" for meticulous workflow monitoring, "Reporting & Statistics" for insightful analytics, and a "Business Component Library" that houses an array of reusable business logic modules.

The intermediary "Business Service Layer" provides foundational functionalities, manages permissions, processes data, enforces business rules, coordinates notifications, and caters to other specialized business processes, integral for the management of rural revitalization projects.

The infrastructure's "Data Center" houses a "Data Cache" for transient data storage, a suite for "Data Processing" to handle computational demands, a "Message Queue Service" to ensure fluid service-to-service communication, and facilities for "Structured Data Processing" to maintain data integrity and order.

The base, known as the "Foundation Service Layer," encompasses essential services like the "Interaction Approval Service" for authenticating transactions, "Cloud Storage Service" for persistent data storage solutions, "Network Services" to guarantee seamless connectivity, and "Security Services" to ensure the platform's integrity and the data's safety.

This platform is meticulously architected to clearly demarcate different functional domains, such as user access, application handling, and data governance, which is pivotal in facilitating scalable, secure, and manageable support for rural revitalization within the tobacco industry.

3.2 Technical Roadmap of the Platform

Figure 2 encapsulates the detailed technical roadmap for the innovative digital cloud platform dedicated to advancing rural revitalization within the tobacco industry, partitioned into four principal segments:

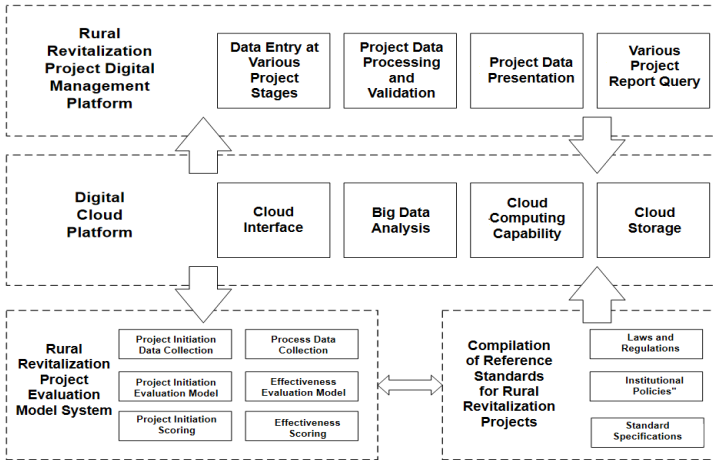


Fig. 2. Schematic of the Technical Roadmap

- **Development of a Digital Management Interface for Rural Revitalization:** Central to this cloud platform is the user-centric digital management interface, designed to streamline the initiation and administration of rural projects. It provides the backbone for inputting crucial data, handling management functionalities, and delivering outputs to end-users. From its inception, the platform will incorporate data handling capabilities—encompassing collection, storage, processing, and retrieval—to support decision-making and dynamic project tracking.
- **Infrastructure for Rural Revitalization Management:** This component constitutes the core infrastructure, housing all functional modules needed for robust project management. The incorporation of big data analytics, pivotal cloud service middleware, and cloud storage services will be prioritized. A specialized suite of big data algorithms will be embedded to augment these modules, while cloud storage will be fortified to safeguard all metadata and associated business intelligence. Interoperable cloud interfaces will also be architected to ensure fluid integration across the platform.
- **Project Evaluation Framework for Rural Revitalization:** A suite of evaluation models will be introduced, serving as the analytical engine for assessing the viability and impact of initiatives. Through a composite of data analysis tools and algorithmic frameworks, these models will process and analyze data to provide evaluative insights, guiding precise project management and enabling informed decisions aligned with field requirements and business realities.
- **Reference Standards for Rural Project Management:** The consolidation of legal frameworks, policy guidelines, standard protocols, and the current operational

landscape in tobacco industry project management will lead to the development of reference standards. These standards will be integral to the platform, offering a benchmark for project evaluation and a guide for strategic management.

In tandem with the technical facets of the platform, a comprehensive user training and support program will be executed. This includes tailored training to acquaint users with the platform's features, analytical tools, and data management procedures. A robust support network will be established to resolve queries, address technical challenges, and offer ongoing aid. Workshops and webinars will be regular fixtures, aimed at nurturing a collaborative learning environment and disseminating industry best practices. Through these efforts, the platform not only prioritizes user competence and assistance but also seeks to galvanize user engagement, thereby amplifying the platform's influence on rural revitalization in the tobacco sector.

3.3 Computational Framework

The computational framework, as visualized in Figure 3, represents an integral part of the cloud platform, specifically designed for the tobacco industry's rural revitalization projects. It delineates a hierarchical structure optimized for advanced data analysis and project management.

At the zenith of this structure, the "Project Various Rating Algorithms Library" is poised as a diverse repository, offering a spectrum of rating and scoring algorithms tailored to project-specific metrics. Directly beneath, "Dataset Management" serves as a crucial component, managing the lifecycle of datasets with operations such as their creation, alteration, interrogation, and maintenance.

The diagram bifurcates into two specialized algorithmic repositories further down. The "Genetic Algorithms Library" resides on the left, housing a collection of algorithms that emulate natural selection, targeting optimization and problem-solving within project contexts. Conversely, the "Neural Networks Algorithms Library" on the right is designed as a trove of neural network-based algorithms, pivotal for pattern discernment, data categorization, and other machine learning-driven tasks.

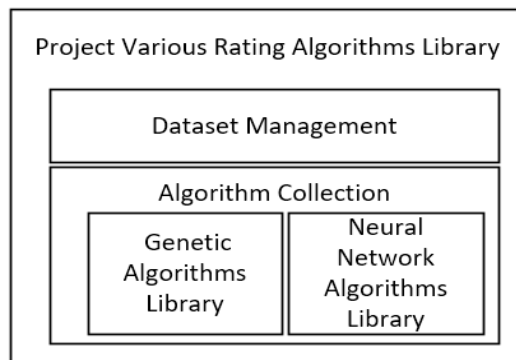


Fig. 3. Computational framework

These constituent libraries amalgamate into a unified suite, equipping the platform with a robust set of tools for tackling complex data-driven challenges inherent in rural revitalization projects.

Complementing the structural components, the platform is engineered to be responsive and evolutionary, keeping pace with technological advancements. It is configured to seamlessly blend emerging technologies, such as artificial intelligence (AI) and machine learning, to enrich its functionality. The adoption of AI could revolutionize predictive analytics, anomaly identification, and the automation of decision-making procedures within the platform.

By harnessing these frontier technologies, the platform not only elevates its operational efficacy but also aligns itself with the dynamic requisites of its users. It is envisioned to continually refine its capabilities, thereby fostering the sustainable progression of rural communities affiliated with the tobacco industry.

3.4 Implementation of the Digital Cloud Platform

Building upon the outlined architecture and technical roadmap, this paper has successfully designed and implemented a digital cloud platform tailored specifically to the tobacco industry for rural revitalization projects. With the invaluable support of the Meizhou Tobacco Monopoly Bureau in Guangdong Province, the platform has been strategically deployed and piloted within the Meizhou tobacco commercial system. Initial implementation efforts have been focused on six towns, including Pingyuan Bachi, Shangju, Meixian Longwen, Wuhua Tanxia, Dabu Xihexia, and Fengshun Pantian, encompassing five counties (districts).

Presently, the digital cloud platform effectively manages nearly 400 projects, spanning various categories such as industry support, infrastructure construction, education assistance, party building support, and skills training. Notable projects include the "6.30" targeted donations by China Tobacco Corporation Guangdong Province Company and external donations facilitated by Guangdong Tobacco Meizhou Company. The precision in managing assistance funds, project inputs, and overall management quality ranks among the top performers in the provincial system.

4 Conclusion

In response to the challenges and deficiencies in current tobacco industry project management, this paper has successfully designed and implemented a digital cloud platform tailored specifically for rural revitalization projects within the tobacco sector. By harnessing the power of cloud interfaces, intelligent algorithms, big data analysis, cloud computing, and cloud storage, in conjunction with relevant legal frameworks and institutional guidelines, the platform provides a quantitative evaluation of rural revitalization project initiation and implementation. It offers efficient project management from inception to completion, effectively mitigating project implementation risks.

Moving forward, the platform will undergo extensive promotion within the Guangdong tobacco commercial system, thereby significantly enhancing the scientific and comprehensive management of rural revitalization projects within the tobacco industry.

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