

Research on the Improvement Mechanism of Public Service Quality from the Perspective of Public Participation —A Case Study of Shenzhen City

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Abstract. Against the background of digital governance, institutionalized public participation is the core path to promote the refined and high-quality development of public services. Taking Shenzhen's digital governance practice as the research sample, this paper adopts a single case study method. Based on Public Value Theory and the Dual-Role Governance Theory of AI, it explores the internal mechanism, practical dilemmas and optimization mechanism of public participation empowering the improvement of public service quality. The research shows that Shenzhen's AI-empowered governance system has effectively realized the gain of operational public value, but there are still structural problems such as superficial public participation and insufficient value co-creation. On this basis, this paper constructs a three-dimensional linkage optimization mechanism to promote the deep coupling of digital technology empowerment and the value of public co-governance, so as to provide theoretical reference and practical experience for domestic digital benchmark cities to improve the public participation system and advance the refined governance of public services.

Keywords: public participation, public service quality, digital empowerment

1. Introduction

The construction of digital government drives the transformation of governance toward agile co-governance. The public is no longer a passive recipient of public services, but a full-process governance subject that runs through demand expression, process supervision and effect evaluation. Institutionalized public participation in digital scenarios is the core endogenous driving force for improving the quality of public services.

As a national benchmark for digital governance, Shenzhen has built an integrated platform for AI-based unified network management and rapid public opinion response, realizing the full closed-loop handling of public demands and forming a typical technology-empowered public participation model. Empirical studies show that AI plays the dual roles of "constraint cage" and "assistant colleague" in local governance. It can not only standardize grassroots work procedures, but also improve government response efficiency and reconstruct a new type of government-citizen interaction [1].

Most existing domestic studies stay at the level of macro policy interpretation and scattered countermeasures, lacking in-depth mechanism analysis of benchmark cities, and there is a disconnect between theory and local practice. For this reason, this paper selects Shenzhen as a single case to carry out normative research, systematically sorts out the operation logic and practical shortcomings of public participation under digital empowerment, and extracts a localized quality improvement mechanism to fill the gaps in existing research. In this paper, public participation refers to full-process institutionalized participation in the digital environment, and public service quality covers four dimensions: supply accuracy, response agility, distribution fairness and public satisfaction.

2. Theoretical logic and local practice in Shenzhen

Government service quality means that service supply can continuously match public expectations and actual needs in the process of the public accessing government services repeatedly [2]. The theory of public service quality management integrates public service and quality management theories, and absorbs management experience from the private sector. The New Public Service Theory advocates taking citizen needs as the core, which aligns with the value goal of this theory. Quality management provides tools for improving public services, and its core concepts include customer orientation, citizen participation, full-process control and continuous optimization [3]. This paper builds the core analytical framework of the full text based on Public Value Theory and the dual-role theory of AI agile governance. Public Value Theory, centered on matching public demand and co-building public interests, distinguishes operational and strategic public values, and provides theoretical support for public participation in governance.

The dual AI governance theory proposed by Li et al. fits well with Shenzhen's digital governance practice and improves the analytical logic in digital scenarios [1]. Artificial intelligence has two-way complementary functions in the public service system: the "AI Cage" relies on digital platforms, algorithmic control and whole-process traceability mechanisms to standardize grassroots administrative discretion, effectively reduce problems such as departmental prevarication and arbitrary services, and ensure the standardization of public service processes; the "AI Colleague" relies on technical means such as big data clustering, intelligent order dispatching and risk early warning to help grassroots levels accurately identify people's livelihood pain points, simplify disposal procedures, and comprehensively improve the agility of public service response.

Digital technology reshapes the operation path of public participation and forms a quality improvement logic covering the whole service chain. At the front end, diverse online channels break down information barriers between the government and the public, make up for the government's weakness in sensing public needs, and resolve the mismatch between supply and demand at the source; in the middle end, real-time public supervision and algorithmic regulation form dual constraints, effectively curbing bureaucratic inertia and formalistic governance; at the back end, public satisfaction feedback forms reverse pressure, pushing the government to continuously rectify shortcomings and iteratively optimize service systems, so as to realize the dynamic upgrading of public services.

Shenzhen's digital practice is highly consistent with the above theories and is an ideal empirical sample. In 2022, Shenzhen launched the integrated reform of people's livelihood demands, integrated 537 scattered demand channels across the city, and built the "@Shenzhen - Rapid Public Opinion Response" integrated intelligent platform [4]. Relying on AI data integration and intelligent research and judgment capabilities, the platform realizes minute-level response to demands, with a 99.34% on-time completion rate for people's livelihood matters, and most people's livelihood issues

are closed within three days. At the same time, a supervision and assessment system centered on public evaluation has been built locally, forming a complete governance chain of "demand submission - intelligent distribution - departmental disposal - result feedback - public review", and creating a digital co-governance model supported by platforms, driven by technology and linked by government and citizens, which provides practical support for the subsequent analysis of practical dilemmas and the construction of optimization mechanisms.

Table 1. Core content of the dual governance roles of AI

AI Governance Role	Core Function Positioning	Specific Governance Effects	Corresponding Public Value Dimension	Adaptation Scenarios in Shenzhen's Practice
AI Cage	Regulatory constraint and process standardization	With the help of algorithmic control, whole-process traceability and time limit constraints, it standardizes grassroots administrative behaviors and realizes full-process control of public services	Operational public value (improvement of efficiency and standardization)	Process supervision, performance assessment and overtime early warning of the rapid public opinion response platform
AI Colleague	Intelligent empowerment and decision support	Relying on big data technology, it accurately identifies people's livelihood pain points, reduces governance costs and improves service levels	Operational + strategic public value (accurate quality improvement and demand adaptation)	Intelligent classification of public demands, research on people's livelihood hotspots, and analysis of governance trends

Combined with the content of the above table, AI intervenes in governance in two ways, thus giving practical significance to the two-way governance idea of "constraint + empowerment". According to factual analysis, this system guarantees the standardization and institutionalization of services, and at the same time uses technology to promote people's participation and drive service upgrading.

3. Practical dilemmas of public participation in public service governance

By combining Shenzhen's digital governance practice with the AI dual governance evaluation framework, Shenzhen's digital participation system has fully released operational public value and improved the efficiency and standards of public services. However, the long-standing structural imbalance of "technology takes priority over co-governance" hinders the creation of strategic public value and further limits the improvement of public service quality.

First, most current public participation is superficial instrumental application, lacking the depth of value co-creation. As far as digital governance is concerned, citizens are generally only allowed to take limited actions afterwards: raising their own problems and evaluating existing services, which has a certain promoting effect on administrative efficiency. However, the public lacks opportunities to speak out and practical participation channels in the design of overall service organization, policy formulation, resource allocation and even institutional reform, and cannot enter the core part of governance. As a result, the vision of creating value through multi-party cooperation is difficult to realize, and the positive significance of public participation in promoting government transformation cannot be fully brought into play.

Second, there is alienation in digital governance, namely the imbalance of human-machine relationship and insufficient digital inclusion. At present, Shenzhen uses a large number of

algorithms and AI to set rigid governance rules. Standard procedures help improve work efficiency, but they reduce the flexibility of grassroots governance and cannot make flexible adjustments to citizens' diverse actual needs. Algorithm-led services fail to well reflect the humanistic spirit. In addition, although the online mechanism has a participation function, it sets imperceptible barriers. Elderly people or people who are not used to digital operations have difficulty completing participation online, and available offline feedback channels are also decreasing. As a result, the right to speak of relevant groups is impaired, and the public services they rely on lack real inclusiveness and fairness.

Third, the quality of public participation is not high, and invalid demands waste governance resources [5]. From the perspective of digital platforms, it is no longer difficult for citizens to participate in governance, and their enthusiasm is also rising. However, many emotional, repetitive or incomplete invalid demands emerge at the same time. The current AI platform only summarizes and roughly classifies the demands, and cannot automatically identify invalid content and issue early warnings. Too much invalid information hinders the grassroots from responding to practical problems, delays the timely solution of people's livelihood issues, reduces the accuracy of governance, and forces the administrative system to do more useless internal work.

Fourth, the governance closed loop is imperfect, and there is a lack of normalized long-term iteration mechanism. Although Shenzhen has built the basic process of "demand acceptance - disposal - public evaluation", the focus of governance is only on resolving individual problems afterwards, lacking systematic institutional optimization thinking. Public evaluation data is only used for single business assessment, and fails to summarize common governance shortcomings based on massive feedback. Case-by-case rectification cannot be transformed into long-term institutional optimization measures, and it is difficult to form a cycle of "finding problems - rectification and improvement - institutional upgrading - service quality improvement", so the long-term governance value of public participation cannot be implemented.

4. Three-dimensional improvement mechanism of public participation empowering public service quality

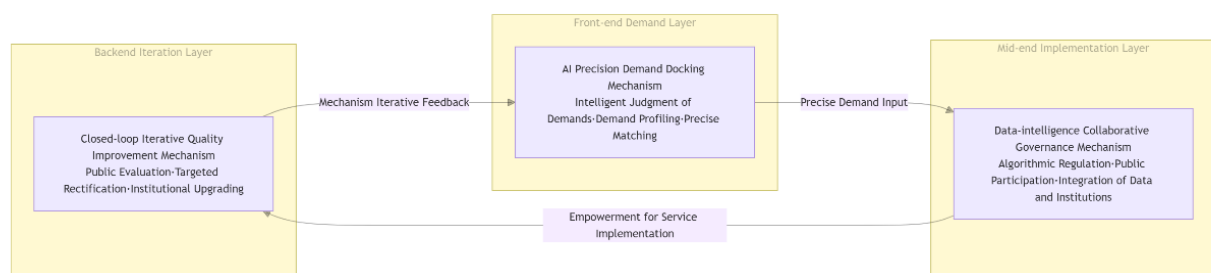


Figure 1. Framework of the three-dimensional linkage improvement mechanism for public participation empowering public service quality

In view of the structural dilemmas of Shenzhen's digital public service governance, combined with the dual functional advantages of AI's "auxiliary empowerment" and "rigid regulation", this paper constructs a localized three-dimensional linkage improvement mechanism of "precise demand docking - digital-intelligent collaborative co-governance - closed-loop iterative quality improvement". It aims to solve the imbalance between technical governance and humanistic co-

governance, realize the deep coupling of the instrumental rationality of digital technology and the value rationality of public co-governance, and build a high-quality development paradigm of public services suitable for digital benchmark cities. To clearly present the hierarchical structure and closed-loop operation logic of the core innovation mechanism of this paper, the following horizontally symmetrical three-dimensional linkage mechanism framework diagram is drawn.

As shown in Figure 1, the three-dimensional mechanism progresses layer by layer and circulates from front to middle to back: the front end relies on AI prediction to resolve the mismatch between supply and demand; the middle end balances the rigidity of algorithms and flexible public participation; the back end relies on evaluation data to promote long-term institutional optimization. The whole closed loop can effectively make up for Shenzhen's governance shortcoming of "valuing technology over co-governance".

First, an AI-based precise demand docking system should be established at the front end. Using AI's data capabilities and trend analysis, the city's people's livelihood demands are summarized, classified and marked with hot spots through big data. Instead of letting the government passively accept orders, it uses big data to identify common people's livelihood problems in various regions and map out residents' actual needs, so that public services can break away from the supply-only mindset and avoid supply-demand contradictions caused by supply absence from the source.

Second, a middle-end digital-intelligent collaborative co-governance mechanism should be established [6]. Appropriately relax the algorithmic regulation of AI, and still control the time and procedures according to the conventional rules of the platform (that is, no delay in handling affairs), but give the public deeper participation opportunities. Integrate public opinion consultation or people's livelihood suggestions into all stages of service design, resource allocation and policy formulation, so as to prevent the public from being only passive feedbackers, make algorithmic governance and people's co-governance complement each other, and at the same time improve government operation efficiency and generate higher strategic public value.

Third, back-end evaluation is the driving force for closed-loop iterative quality improvement. It is necessary to build a complete chain of "public feedback - big data research and judgment - departmental rectification - performance publicity - institutional iteration". Conduct regular analysis based on a large amount of evaluation data obtained from the platform, summarize the status of institutional arrangements and services, and then explore how to improve processes and policies. Instead of being satisfied with correcting individual cases, we should constantly update public service forms with the help of public evaluation. The coordinated and complementary operation of the three-layer mechanism will help Shenzhen solve the difficulties in digital governance and achieve long-term and steady improvement of various services.

5. Optimization paths for improving public service quality

First of all, we need to rethink the way of human-machine collaborative governance and make appropriate adjustments to digital governance. Digital technology should not be overused as a governance tool. We should reasonably adjust the rigid control of AI algorithms, and include complex or special people's livelihood needs into the scope of flexible handling and manual verification [7]. We also need to continuously create conditions for high-level public co-governance, so that citizens can understand, make suggestions on and supervise service design, policy improvement and resource allocation, so as to achieve a balance between efficiency and value: governance is supported by technology, and technology promotes co-governance.

Second, we need to improve the governance system through digital inclusion to make governance fairer and more inclusive. Give special consideration to the elderly or people with low digital

literacy, include offline demand submission, feedback and evaluation in the handling scope, continuously optimize online operation methods, and design elderly-friendly and barrier-free service forms. Eliminate participation barriers set by digital governance, treat the role of all social members in public services in accordance with the principle of equal rights, avoid unfair phenomena in digital governance, and strive to promote the balanced delivery of various services across the whole society.

In addition, we need to promote rational and orderly public participation and improve participation quality. Use AI technology to identify, filter and prompt meaningless or repetitive demands. Technically, this can reduce governance waste caused by invalid participation. At the same time, through policy explanation, community education, platform design and other methods, guide the public to think, learn and practice relevant participation rules, so that participation is more civilized, practical and focused, thus improving the overall efficiency of all kinds of public participation and reducing deviations or omissions.

Finally, a normalized iterative improvement mechanism should be established to deliver tangible governance effects. Take all kinds of public service evaluations, demand handling results and related problems as analysis objects, and incorporate them into departmental performance assessment and institutional reform thinking. Transform case-by-case rectification into institutional arrangements, so as to promote the continuous improvement of services and the gradual improvement of governance level, and finally form a sustainable virtuous cycle of governance.

6. Conclusion and prospect

This paper takes the digital governance implemented in Shenzhen as a case for analysis, and combines the public value perspective and AI-related dual governance ideas to examine the significance of public participation in improving public services, as well as its practical difficulties and solutions. The analysis shows that the technology-based participation mode adopted in Shenzhen can improve efficiency and generate operational public value, but it has not yet solved problems such as participation depth, digital equity, human-machine coordination and sustainable updating. The three-dimensional linkage mechanism proposed in this paper makes up for the deficiency of existing studies that focus on appearance rather than internal causes. It combines digital methods with diversified governance modes and provides a feasible scheme for quality improvement in digital cities. Relevant studies have certain reference value for all regions to improve public participation or service details in digital government construction. At present, only a qualitative study of a single case has been carried out. In the follow-up, quantitative methods should be supplemented to test the actual effect and compare the situations of multiple cities, so as to enrich the theoretical content of digital co-governance with this research idea.

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