

# Practical Dilemmas and Optimization Paths of Digital Technology Empowering the Equalization of Public Services

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**Abstract:** This paper focuses on the practical process of digital technology empowering the equalization of basic public services, aiming to reveal the realistic dilemmas and propose systematic optimization paths. The research finds that although the introduction of digital technology can improve service efficiency and accessibility, in practice, the development gap between regions leads to unequal starting points in digital construction. Differences in public digital literacy and equipment access conditions form new participation barriers for the elderly, low-income groups, and other vulnerable groups. In addition, the insufficient integration of existing institutional rules with digital technology may solidify or even strengthen traditional service barriers in the digital space. In response to the above structural, institutional, and procedural dilemmas, this paper puts forward optimization directions from four aspects, emphasizing the need to go beyond a purely technical tool perspective. Only through the coordinated development of technology, institutions, and human capabilities can digital technology truly empower basic public services to move towards inclusiveness, accessibility, and balance.

**Keywords:** Digital Technology; Equalization of Public Services; Practical Dilemmas; Optimization Paths

## 1. Introduction

Against the macro background of comprehensively advancing Chinese-style modernization and the common prosperity strategy, the equalization of public services has become an important policy issue for realizing social fairness and justice and promoting the coordinated development of urban and rural areas and regions. With the acceleration of the digitalization process, digital technology is widely regarded as a key enabling tool to

improve the supply efficiency of public service equalization, optimize resource allocation, and enhance service capacity. However, in the process of practical advancement, the empowerment of digital technology for public service equalization is not a one-way release of technological dividends, but also presents a complex effect of coexisting "empowerment" and "disempowerment". Therefore, by systematically sorting out the existing research results on digital technology empowering the equalization of public services, it is found that most of the existing literature focuses on the positive role of digital empowerment, and there is little research on the potential problems of exacerbating inequality. Therefore, this study identifies existing literature gaps and practical dilemmas, and further proposes optimization paths, putting forward some preliminary thoughts on the research in this field, in order to provide some supplements to the relevant research on digital technology empowering the equalization of public services and a reference for the optimization direction in practice.

## 2. Literature Review

### 2.1 Connotation and Evolution of the Equalization of Public Services

The equalization of public services is a core issue of China's public policies, and its connotation has been continuously deepened with the development stage. In this theoretical evolution, Rawls' theory of justice provides an important philosophical support. Rawls advocates that the arrangement of the basic structure of society should follow the principle of "justice as fairness", especially the "difference principle", that is, under the premise of ensuring the equality of basic freedoms, social and economic inequalities should be to the greatest benefit of the least advantaged groups. Academic circles generally believe that the equalization of public services not only focuses on the equality of resource allocation

results, but also emphasizes the fairness of development opportunities and the improvement of institutional guarantees. From the perspective of theoretical evolution, the concept of equalization has undergone a transformation from supply-oriented quantitative equality to demand-oriented balanced accessibility [1]. Early policy practices focused on narrowing regional gaps, supporting underdeveloped areas through fiscal transfer payments and other means, and promoting the initial balance of public services between urban and rural areas and groups. With the economic and social development, the connotation of policies has gradually enriched, covering not only traditional fields such as education, medical care, and social security, but also emphasizing the realization of dynamic balance and sustainable development through institutional and mechanism innovation.

In terms of practical evolution, China's strategy for the equalization of public services has shown significant phased characteristics. Since the concept of "equalization of public services" was first proposed in national documents in 2005, the policy focus has gradually expanded from regional balance to urban-rural coordination and group fairness [2]. During the "11th Five-Year Plan" to the "13th Five-Year Plan" periods, the state promoted the upgrading of the basic public service system from ensuring basic needs to improving quality and efficiency through multiple means such as planning guidance, standard setting, and fiscal system reform [1]. Entering the "14th Five-Year Plan" period, the goal of equalization has been further deeply integrated with the common prosperity strategy, emphasizing the construction of a public service supply pattern guaranteed by the government, participated by multiple social sectors, and co-built and shared by all people through institutional integration, resource coordination, and governance innovation. The Report to the 20th National Congress of China clearly incorporates "enhancing the balance and accessibility of basic public services" into the path of realizing common prosperity, marking that it has risen from a simple resource allocation issue to an important institutional support for Chinese-style modernization. This evolutionary process fully reflects the theoretical deepening and practical innovation of China's public service policies from single supply to systematic governance and from static

balance to dynamic adaptation.

## **2.2 Cutting-Edge Research on Digital Technology Empowering the Equalization of Public Services**

### **2.2.1 Multi-Dimensional exploration of digital technology empowering the equalization of public services**

The deepening of empowerment modes and theoretical logic has become a core focus of current research. Early studies mostly regarded digital technology as a linear tool to improve efficiency and expand coverage [3]. In recent years, cutting-edge research, especially combining the theoretically distinctive Chinese concept of "new quality productive forces", has proposed a more integrated and dynamic analytical framework. Studies have pointed out that digital technology empowerment is not a simple technical superposition, but a process of systematic reconstruction. Taking digital healthcare as an example, it innovates production factors through technology embedding, such as AI-assisted diagnosis and intelligent medical devices; optimizes management processes through paradigm construction, such as hierarchical diagnosis and treatment and remote health monitoring based on big data; and ultimately promotes the interaction and collaborative development of the medical field and the digital economy in innovation chains, industrial chains, and talent chains through ecological construction. This analytical framework of factors, paradigms, and ecology [4] marks a shift from focusing on the short-term effects of technological applications to exploring how digital technology, as a revolutionary productive force, fundamentally reshapes the production function and sustainable development ecology of public service supply [5].

Governance transformation involves systematic reconstruction and the establishment of a new effectiveness evaluation system. Cutting-edge research focuses on the reconstruction of matching organizational forms, institutional rules, and evaluation systems. This mainly includes how to break data barriers between departments through top-level design, establish unified data standards, open sharing, and security governance mechanisms; how to clarify the powers, responsibilities, and interest distribution mechanisms of all parties in the digital public service ecosystem[4], and how to

build a new effectiveness evaluation framework that goes beyond traditional efficiency indicators and can comprehensively measure service accessibility, balance, public satisfaction, digital inclusiveness, and long-term social benefits [5]. This research direction aims to ensure that technological empowerment can be effectively absorbed, regulated, and guided, and ultimately serve the strategic goals of inclusive equality of public services and common prosperity.

Key application scenarios are experiencing in-depth breakthroughs in the context of digital empowerment for public service equalization. Research on key application scenarios is achieving breakthroughs by moving beyond access to focus on precision, personalization, and value transformation. Existing research on digital empowerment for the equalization of public services covers a variety of application scenarios, including sports and health, medical care, culture, urban-rural integration, rural revitalization, and so on. In specific application fields, cutting-edge research has gone beyond the initial pursuit of online accessibility and focused on how to use technology to achieve precise, personalized, and integrated service supply. For example, in the field of urban and rural public medical care, the research frontier focuses on building an inter-level linked digital health community to solve the obstruction of the sinking of high-quality resources. In the field of urban and rural public cultural services, cutting-edge explorations focus on how digital platforms promote the balanced allocation and value regeneration of cultural resources, analyze how digital platforms spread high-quality urban cultural resources to rural areas, and realize the precise identification of cultural needs and personalized push of supply through big data analysis, thereby reshaping rural public cultural spaces and value identity [6]. These studies collectively indicate that digitalization is not only an extension of channels, but also a profound transformation of service connotation, experience, and public value.

#### 2.2.2 Differentiated focus of domestic and foreign research

Domestic research shows strong practical orientation, systematic thinking, and macro characteristics of policy relevance. Its advantage lies in closely responding to national strategies and conducting theoretical refinement and model summary based on rich local practices.

The research focus is concentrated on three aspects. First, the research is closely embedded in major national strategic deployments such as Digital China, common prosperity, and rural revitalization, with strong policy responsiveness. A large number of studies focus on the equalization of basic public services between urban and rural areas and regions [7]. Second, in terms of research paths, macro institutional analysis and meso mechanism exploration are equally emphasized. On the one hand, studies focus on analyzing the structural constraints of macro institutional arrangements such as fiscal transfer payments, household registration systems, and national investment in digital infrastructure on the effect of digital empowerment[8], on the other hand, they actively explore meso mechanisms such as tripartite collaboration, value co-creation, and platform governance, emphasizing the possibility of multiple subjects including the government, market, and society collaborating to integrate resources and innovate service models in grass-roots scenarios such as communities[9]. Third, in terms of resolution paths, domestic research generally emphasizes holistic and systematic solutions, advocating both promoting the construction of inclusive digital infrastructure and the balanced allocation of core digital resources through national forces, and implementing concepts such as universal design and digital mutual assistance in service processes to block digital screening chains [10]. In contrast, foreign research focuses more on the perspective of civil rights and the micro-deconstruction of algorithmic justice. First, theoretical dialogues often originate from contexts such as citizenship theory and critical race theory, emphasizing the direct impact of digitalization on the civil rights of specific vulnerable groups, and exploring how digital exclusion intersects with socio-economic exclusion and cultural exclusion to form new marginalization mechanisms [11]. Second, in terms of problem analysis, the criticism of algorithmic black boxes, data privacy, and surveillance capitalism is more in-depth and specific. A large number of studies focus on the discriminatory consequences of algorithms in areas such as welfare distribution, criminal justice, and credit evaluation, and explore how data biases, value orientations in model design, etc., within the technology can automatically and on a large scale reproduce social

injustice[12]. Third, in terms of solutions, in addition to calling for government responsibility and digital inclusion policies, more emphasis is placed on legal regulation, ethical frameworks, and technological governance, trying to embed fairness values from the source of technological governance.

The complementarity of the two constitutes a complete academic landscape in this field. The macro systematic perspective and large-scale governance wisdom provided by domestic research help avoid fragmented discussions falling into technocentrism, while the profound insights of foreign research on the micro power of technology, the protection of individual rights, and ethical risks provide an indispensable reference for China to warn of potential risks and improve governance details in the process of rapid digitalization.

## **2.3 Positive Impacts of Digital Empowerment on the Equalization of Public Services**

### **2.3.1 Resource allocation level**

Digital technology has broken the geographical boundaries and administrative barriers of traditional public services, promoting the sinking of high-quality resources to the grassroots and cross-regional flow. By building panoramic digital platforms and intelligent service systems [7], core public service resources such as education and medical care can be shared beyond physical limitations. For example, telemedicine systems allow rural residents to easily access high-quality diagnosis and treatment services in cities, and online education platforms have narrowed the urban-rural gap in educational resources [13]. The opening and sharing of public data have further optimized the efficiency of resource allocation. For instance, agricultural production entities can achieve precise planting with the help of public data such as meteorology and markets [14], and financial institutions provide precise financial services for rural business entities based on public data, promoting the agglomeration of resources in areas with concentrated needs.

### **2.3.2 Service efficiency improvement level**

Digital technology has promoted the precision and efficiency of public service supply. Technologies such as big data and artificial intelligence can accurately identify the service needs of different groups, and promote more personalized public services that meet the needs

of different groups through demand profiling and intelligent matching [15]. The online handling function of digital platforms has greatly simplified service processes. Reforms such as "One Network for All Matters" and "At Most One Visit" have improved service accessibility and reduced the cost of handling affairs for the public [16]. At the same time, digital technology provides a sustainable financial guarantee for the equalization of public services by alleviating government financial pressure and improving financial transparency [13], enabling the government to more efficiently coordinate the allocation of public service resources.

### **2.3.3 Supply model innovation level**

Digital technology has promoted the formation of a multi-stakeholder collaborative public service supply pattern. Subjects such as the government, enterprises, and social organizations can achieve cross-border collaboration through digital platforms. For example, the value co-creation model led by financial institutions has effectively solved the problem of insufficient financial resources for basic public services, and the smart community and digital village platforms built through government-enterprise cooperation have enriched the content and forms of service supply. Digital technology has also spawned new service forms such as mobile medical care and online consultation, extending the coverage of public services, especially providing convenient service channels for remote areas and groups with limited mobility [4], promoting public services to break through fixed supply and transition to full-scenario coverage, laying a solid foundation for achieving the goal of equal public services in terms of opportunities and levels.

## **2.4 Literature Review**

Existing studies generally start from a positive perspective, emphasizing the multiple empowerment mechanisms of digital technology in promoting the equalization of public services, while relatively ignoring the unequal problems that may arise or be exacerbated in the process of digitalization. Only a few studies have begun to pay attention to the digital divide and service exclusion caused by factors such as uneven popularization of digital technology, differences in digital literacy, and algorithmic discrimination, pointing out that while digital

technology improves the service experience of some groups, it may further marginalize digital vulnerable groups such as the elderly, low-income groups, and residents in remote areas, forming a "Matthew Effect".

Therefore, this paper focuses on the practical dilemmas arising in the process of digital technology empowering the equalization of basic public services. Starting from the structural, institutional, and procedural levels, it focuses on exploring why and how digital technology derives or exacerbates unequal problems while promoting service improvement, and then puts forward targeted optimization paths, in order to provide reference and inspiration for promoting the real realization of inclusive, accessible, and balanced development of public services in the digital era.

### **3. Practical Status of Digital Technology Empowering the Equalization of Public Services**

#### **3.1 Continuous Expansion of the Coverage of Grassroots Digital Infrastructure**

China has continuously promoted the extension of digital infrastructure construction to the grassroots, and the breadth and depth of network coverage have been continuously improved. All administrative villages in the country have basically achieved "broadband access in every village", the network access conditions in rural and remote areas have been significantly improved, and 5G networks have gradually covered counties and key villages. In 2023, the number of rural netizens in China reached 301 million, and the internet penetration rate in rural areas reached 60.5%, which provides a basic network condition for the sinking of services such as distance education, online medical care, and digital government affairs to the grassroots. At the same time, government service platforms at all levels are accelerating their extension to towns and villages, and many places have initially built an online government service system covering multiple levels. In the first half of 2022, the scale of China's 5G network continued to expand, with 1.854 million 5G base stations built and put into operation, and some high-frequency service items can be handled online at the grassroots level. The extensive coverage of network infrastructure and the online extension of government services have provided a physical and platform foundation for

public service resources to break geographical limitations and achieve sharing on a larger scale.

#### **3.2 Progress in Digital Applications in Key Public Service Fields**

The application of digital technology in multiple grassroots public service fields has been continuously deepened, spawning new service forms. In the field of government services, reforms such as "One Network for All Matters" and "At Most One Visit" have been extended to the grassroots relying on unified platforms, aiming to simplify processes and improve the ability of cross-level business collaboration. In the field of medical and health care, "Internet and Medical Health" has explored feasible paths to promote the radiation of high-quality medical resources to the grassroots through teleconsultation, online health consultation, and other forms. For example, the WeDoctor platform project has built a national remote medical collaboration platform for grassroots doctors, covering more than 2,700 key hospitals across the country, with 36 internet consultation centers and 58 internet grassroots reception points built, and the scale of online medical users has reached 68.75 million. In the field of education, digital educational resources have tried to make up for the shortcoming of uneven distribution of urban and rural educational resources through online courses, synchronous classrooms, and other methods. The scale of rural online education users has reached 67.87 million, and the educational satellite broadband transmission network directly serves teachers and students in rural primary and secondary schools, realizing the full coverage of digital education in 64,000 teaching points across the country. In addition, the application of digital tools is gradually increasing in fields such as social security and public culture. These practices indicate that the supply of basic public services is gradually shifting from mainly relying on physical venues and face-to-face interaction to an integrated online-offline model that emphasizes accessibility and convenience.

#### **3.3 Initial Accumulation of Data Resources and Construction of Management Platforms**

With the promotion of various digital applications at the grassroots level, the data resources generated in the process of public services have become increasingly abundant, covering basic data such as population, legal

persons, and geographic information, as well as multi-dimensional business data such as government services and community management. Some regions have begun to explore the establishment of unified data management platforms or grassroots data collection mechanisms, trying to initially integrate scattered data. The formation of these data resources provides potential data support for analyzing service needs, identifying service hotspots, and evaluating service effectiveness. Some localities have tried to use the aggregated data to identify groups such as the elderly and the disabled, and provide more targeted service information push. It should be noted that the in-depth application of current data in driving service precision and intelligence is still in its initial stage, and its full value needs to be further explored.

### **3.4 Initial Formation of a Pattern of Multi-Stakeholder Participation in Service Supply**

In the process of digital transformation of grassroots public services, the participating subjects have shown a diversified trend. In addition to government leadership, forces such as internet enterprises, social organizations, and communities themselves have become increasingly active. Enterprises mainly provide technical solutions and platform support for project construction; social organizations carry out community public welfare and cultural activities with the help of digital tools; grassroots communities use new media platforms for information release and resident interaction. Government-enterprise cooperation has become an important model for promoting the implementation of projects such as smart communities and digital villages. This multi-participation situation helps enrich service content and innovate service forms. However, the coordination mechanism, power and responsibility relationship, and long-term cooperation model among various subjects are still being explored and constructed. How to form a stable, efficient, and public interest-oriented collaborative supply system is an important issue in current practice.

### **3.5 Continuous Improvement of Top-Level Policy Design and Institutional Framework**

At the national level, a series of policy documents such as the "Digital Rural

Development Strategy Outline" and the "14th Five-Year Plan for Public Services" have clearly identified digitalization as an important path to improve the capacity of grassroots public services and promote equalization. Local governments have formulated corresponding implementation plans accordingly. These policies emphasize principles such as balanced coverage of infrastructure, orderly sharing of data, innovation of service models, and inclusive development from a strategic perspective, providing directional guidance for grassroots practice. At the same time, laws and regulations related to data security and network security have been gradually improved, delineating the compliance boundaries for grassroots digital exploration. The continuously optimized policy and institutional environment provides the necessary guidance and guarantee framework for the digital transformation of grassroots public services to move from local pilot projects to systematic and standardized development.

## **4. Practical Dilemmas of Digital Technology Empowering the Equalization of Basic Public Services**

Digital technology is highly expected to promote the equalization of basic public services by improving efficiency and expanding coverage. However, in practice, this empowerment process faces multiple challenges, resulting in the failure of technological dividends to evenly benefit all groups and regions, and even exacerbating existing gaps in some cases.

### **4.1 Inheritance and Strengthening of Existing Regional Development Differences by Digital Construction**

The planning, investment, and operation of initial digital public service platforms are highly dependent on local fiscal capacity, information technology infrastructure, and professional talent reserves. The objectively existing unbalanced regional development directly leads to unequal starting points in the construction of digital public service systems. For example, in the deployment of smart community platforms and telemedicine systems, eastern coastal cities or central cities are often the first to obtain more abundant funds, more advanced technical solutions, and more comprehensive operation and maintenance, thereby providing digital

services with more comprehensive functions and better experience. In contrast, many grassroots areas in the central and western regions and rural areas are limited by resource constraints, and their digital service systems often remain at the stage of online basic functions, with problems such as fragmented platforms, unconnected data, and insufficient service depth. This difference in initial conditions makes digital technology not only fail to effectively narrow the service capacity gap between regions, but may also further expand the leading advantages of developed regions in the digital dimension, forming a regional differentiation phenomenon in the process of digital transformation of public services.

#### **4.2 New Participation Thresholds Arising from Differences in Digital Literacy and Access Conditions**

The digital transformation of public services means that the way of accessing services has shifted from traditional offline windows to online platforms and intelligent terminals. This transformation requires service recipients to have basic digital device operation capabilities, information understanding capabilities, and online transaction handling capabilities. However, there are significant differences among the public in terms of digital skills, device ownership, and network usage habits. Young groups, highly educated individuals, and urban residents usually have strong digital adaptability and can smoothly use various digital public services. In contrast, the elderly, groups with low educational levels, low-income families, the disabled, and some residents in remote areas may be blocked from efficient and convenient digital service channels due to their inability to use smartphone applications, unfamiliarity with online authentication processes, inability to understand complex interface information, or lack of necessary internet access devices. As a result, the convenience brought by digital technology is mainly enjoyed by digital natives or groups with strong digital adaptability, while those vulnerable groups who are most in need of public service support may be blocked from efficient service channels due to insufficient digital capabilities, facing new obstacles to service accessibility in the digital era.

#### **4.3 Institutional Exclusion May Arise from**

#### **Insufficient Integration of Institutions and Digital Technology**

In the process of digital transformation of public services, many existing offline management rules and service processes are directly migrated to online platforms. For example, the qualification recognition of public services based on household registration location and the review process based on paper certification materials may be transformed into online filling and electronic license verification after digitalization [9]. If this conversion process only focuses on formal digitalization and lacks careful consideration of fairness and inclusiveness in the digital environment, then the institutional divisions based on identity and region in the offline era may be transplanted into the digital space intact, and even strengthened due to the standardization and rigidity of digital processes. In addition, with the deepening application of big data analysis and automated decision-making algorithms in links such as service distribution and qualification screening, the design logic of algorithms, the composition of training data, and the selection of optimization goals may inadvertently embed the subjective tendencies of designers or reflect the structural biases existing in historical data, which may inadvertently produce systematic discrimination against specific groups, such as people of specific occupations and regions. Moreover, due to the opacity of the algorithmic decision-making process, such problems are difficult to detect and correct in a timely manner. This indicates that without matching institutional adaptation and value guidance, technological empowerment may not only fail to eliminate traditional injustices, but even automate and scale them under the guise of technological neutrality.

### **5. Root Cause Analysis of Practical Dilemmas**

#### **5.1 Structural Level**

China's long-standing urban-rural dual structure, significant regional development gaps, and social stratification constitute the macro background and basic constraints for the digital transformation of public services. These structural characteristics determine that governments at different regions and levels have huge differences in available financial resources, technical foundations, and human resources

when promoting digital reform. The introduction and application of digital technology do not take place in a homogeneous blank field, but in a socio-economic structure where an unbalanced pattern already exists. Therefore, digital construction is difficult to completely get rid of path dependence, and its effectiveness is often positively correlated with the original development level, leading to a new gap in the supply capacity of digital public services in spatial distribution that overlaps with existing gaps. This fundamentally explains why relying solely on technical tools cannot automatically achieve service equalization, because the exertion of technical effectiveness is deeply restricted by the socio-economic structure in which it is embedded.

### 5.2 Institutional Level

The current policy system, standards, and governance framework related to digital public services are still in the stage of development and improvement, with certain lag and blind spots. On the one hand, the specialized institutional design to ensure the universal accessibility and fair enjoyment of public services in the digital environment is not yet sound. For example, when promoting "One Network for All Matters", there is a lack of unified and mandatory operational guidelines and guarantee mechanisms nationwide to ensure that the rights of citizens who are unable to operate online are not impaired. On the other hand, the corresponding regulatory rules, ethical guidelines, and accountability mechanisms for new risks brought by the application of digital technology, such as algorithmic discrimination, data monopoly, and digital exclusion, are relatively lagging behind. The insufficient institutional supply makes the promotion of digital public services lack clear fair value orientation and effective risk prevention and control tools to a certain extent, and it is easy to slide towards a one-dimensional development driven by efficiency and technology.

### 5.3 Procedural Level

The implementation of digital public services involves the entire cycle from planning and design to operation and maintenance, as well as complex interactions among multiple subjects such as the government, enterprises, social organizations, and citizens. In this process, if there is a lack of effective public participation

and demand feedback mechanisms, the design of service systems is likely to be oriented towards the convenience of managers or technology providers, rather than focusing on the needs of users, especially vulnerable users. At the same time, digital literacy training has not been fully valued and invested as a systematic and long-term national project, leading to the overall speed of public digital capability improvement lagging behind the speed of technological iteration and service upgrading. In addition, inter-departmental and cross-level business collaboration and data sharing still face institutional and mechanism obstacles, restricting the supply of precise and equal services based on data integration. The combined effect of these procedural obstacles causes deviations between good technical schemes and policy intentions during implementation, making it difficult to transform them into equal service experiences accessible to all groups.

## 6. Optimization Paths of Digital Technology Empowering the Equalization of Basic Public Services

### 6.1 Strengthen the Balanced Layout and Inclusive Access of Digital Infrastructure

At the national and provincial levels, it is necessary to strengthen overall planning and resource inclination, and focus on supporting the upgrading of broadband networks, mobile communication coverage, and the deployment of public digital terminals in rural areas, remote areas, and poverty-alleviated areas through various means such as central fiscal transfer payments, cross-regional assistance, special bonds, and public-private partnerships. The goal is to make up for the shortcomings of grassroots digital infrastructure, eliminate the physical divide in network access, ensure that all regions can meet the basic network conditions supporting high-quality digital services, and achieve the simultaneous improvement of the breadth and depth of network coverage. At the same time, it is necessary to promote the orderly opening and shared use of public data resources, break data barriers, and provide data support for cross-regional and cross-level collaborative services.

### 6.2 Implement User-Centered, Inclusive, and Beneficial Service Design Principles and

### **Supply Models**

First, in the design and development of government service websites, mobile applications, and other platforms, it is mandatory to incorporate aging-friendly and barrier-free standards, and provide multiple alternative service channels such as simple modes, voice assistance, and video assistance. It is resolutely prohibited to cancel offline service channels due to digitalization. Instead, traditional methods such as physical halls, telephone hotlines, and home-based services should be retained and optimized to form an integrated online-offline service system that provides bottom-line guarantees for groups without digital capabilities. Second, promote the diversification and personalization of service supply. Through government procurement of services, cooperative co-construction, and other methods, enrich service content and forms. Based on big data analysis, accurately identify the differentiated needs of grassroots masses, launch personalized service packages, and provide customized digital public services for different groups such as the elderly and rural residents according to their needs. Third, improve the data collection mechanism of grassroots public services, expand the coverage of data on vulnerable groups, and enhance data representativeness and completeness. When using intelligent algorithms for service push and qualification pre-screening, establish an algorithm impact assessment and audit system to ensure its fairness, transparency, and accountability.

### **6.3 Accelerate the Improvement of Institutional Norms and Standard Systems in the Field of Digital Public Services**

Study and formulate special policies and regulations on the development of digital public service equalization, clarifying the responsibilities and obligations of governments at all levels and relevant departments in promoting digital inclusion and safeguarding digital rights. Establish and improve a standard system covering the entire process of digital public services, including technical standards, service standards, safety standards, and ethical standards. In particular, strengthen the legislation and supervision of algorithm applications and data security, establish relevant ethics committees, conduct pre-assessment, in-process monitoring, and post-audit of

algorithm models used in grassroots digital public services, and correct data biases and algorithmic prejudices. Encourage grassroots masses to participate in the design and optimization of algorithms to ensure that algorithm logic conforms to the principles of fairness and justice. At the same time, reform unreasonable clauses in traditional systems that restrict equalization, gradually weaken identity restrictions such as household registration and place of origin that are not directly related to access to public services, and build a universal public service system based on citizenship.

### **6.4 Implement a Systematic and Differentiated National Digital Literacy and Skills Enhancement Project**

Incorporate digital literacy education into the national education system and lifelong education system. Targeting key groups such as the elderly, the disabled, and farmers, led by the government, and in conjunction with communities, enterprises, public welfare organizations, and other forces, carry out regular and life-oriented digital skills training and assistance activities. Encourage the development of digital volunteer services and establish a community digital counselor system. Through extensive publicity, raise the awareness of the whole society on the importance of digital inclusion, and create a digital cultural atmosphere of active learning, mutual assistance, and sharing.

### **7. Research Conclusions**

China's digitalization of basic public services has made remarkable progress, with the continuous expansion of infrastructure coverage, the deepening of applications in key fields, the initial accumulation of data resources, and the gradual emergence of a multi-participation pattern. However, at the same time, digital technology empowerment still faces three major dilemmas: structural, institutional, and procedural. Regional development differences are inherited or even strengthened by digital construction; differences in digital literacy and access conditions spawn new participation thresholds; insufficient integration of institutions and digital technology may lead to institutional exclusion. As a result, technological dividends have not been equally shared by all groups, and even exacerbated existing service gaps in some cases.

Looking forward, to promote digital technology to truly empower the equalization of basic public services, it is necessary to go beyond simple technology introduction and move towards a systematic, inclusive, and governance-oriented development path. This requires building a framework for the coordinated evolution of technology and institutions. On the basis of continuously strengthening the balanced layout and inclusive access of infrastructure, integrating the concept of inclusiveness into the entire process of service design, supply, and evaluation, improving the institutional norms and standard systems in the field of digital public services, and blocking the digital exclusion chain through the systematic implementation of the national digital literacy enhancement project. Only in this way can we consolidate the bottom line of fairness in the process of digitalization, make public services more inclusive, balanced, and accessible, and solidly promote the realization of the goals of common prosperity and Chinese-style modernization.

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