Evaluation Report on Worldwide City Hotline Services and Governance Effectiveness

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Foreword

Cities represent the future of human life on a global scale. High-quality urban governance is essential for maintaining a city's core competitiveness, development vitality and cultural appeal. As urbanization accelerates at an unprecedented pace worldwide, the complexity and diversity of urban life are constantly growing. In tandem, the needs of citizens are becoming increasingly diverse and distinctive, placing unparalleled pressure and challenges on the efficiency of public service supply and the capacity for urban governance. Addressing the governance challenges of cities, especially those of megacities, has become an overarching question of our era.

The success of a government hinges on following the will of the people; the secret of governance lies in heeding the voice of the people. Urban government service hotlines are vital bridges connecting governments and citizens, sensors for gauging public sentiment, information hubs gathering diverse governance stakeholders, express channels for information flow between governments and citizens, and platforms for collaboration among regions and departments. Their growing importance in urban services and governance cannot be overstated. Besides accurately capturing and addressing the most pressing difficulties and problems of great concern to citizens in real time, city hotlines leverage extensive data analysis to uncover the underlying patterns of urban dynamics. They can also predict the trends of social issues, paint a precise picture of public sentiment, and act as diagnostic tools for urban governance. Innovation in urban governance driven by hotlines not only enhances the supply-side tool matching capabilities of urban public services but also bears on the realization of public value on the demand side.

Over the past few years, city hotlines like Beijing's 12345 hotline have been deeply integrated into all aspects and scenarios of urban governance. Since 2019, Beijing's innovative push for swift response to public complaints has created a governance model characterized by comprehensive feedback, wide-ranging services, closed-loop management and broad citizen participation. This initiative has pioneered a uniquely Chinese path to modern urban governance, and contributed a groundbreaking "Beijing model" and Chinese solution to the global wave of hotline-driven urban governance. Meanwhile, government service hotlines across the globe have exhibited diverse development trajectories. In cities like New York, San Francisco and Toronto, 311 hotlines consolidate municipal services into unified platforms, thus offering one-stop access to services, alleviating pressure on 911 emergency hotlines and improving service efficiency. Seoul's 120 hotline established by the municipal government streamlines access to municipal services by providing extensive consultation services on urban

facilities, public services, administrative procedures and local policies, while enhancing service transparency and efficiency. In the shared pursuit of efficient public services and swift response to citizens' needs, cities around the world have leveraged their unique characteristics and resource endowments, explored hotline service models suited to specific locations, time and issues, and established distinctive mechanisms for addressing citizens' complaints. In the dynamic landscape of hotline development, cities are penning their own responses to the challenges of urban governance. The evolution of worldwide city hotline reflects profound changes in urban governance from rudimentary expressions of concerns to precise understanding of problems and from responsive to proactive service innovations. This shift shows a transition from responsive to proactive governance and from centralized to participatory governance.

Conducting systematic evaluations of worldwide city hotline can support scientific decision-making for optimizing resource allocation, enhancing public service effectiveness, fostering urban governance innovation and driving structural governmental reforms. However, a review of existing global research on hotline evaluations reveals that most studies focused on procedural aspects, such as call handling, task assignment, resolution and evaluation, while paying little attention to systemic governance metrics like governance structural collaboration, urban governance functionality and public perception. To fill this gap, the current research team has developed a "4G" framework for assessing worldwide city Hotline servicesand governance effectiveness. Anchored in the principles of good governance, the framework evaluates hotline performance across four primary dimensions: process governance, collaborative governance, smart governance and responsive governance. It also adopts 10 secondary and 24 tertiary indicators. After an initial selection of over 200 cities, the study identified 20 representative cities for assessment, taking global influence, population sizes, regional representativeness and expert recommendations into consideration. The selected cities are Beijing, Shanghai, Guangzhou, Hangzhou, Wuhan, Chengdu, Nanjing, Xi'an and Hong Kong in China; Seoul in the Republic of Korea; Singapore; Tokyo in Japan; Berlin in Germany; Paris in France; Madrid in Spain; London in the United Kingdom; Rio de Janeiro in Brazil; Toronto in Canada; and New York and San Francisco in the United States.

The results categorize the 20 cities' hotlines into four types based on the four evaluation dimensions: integrated, distinctive, innovative and inclusive development. Beijing, Guangzhou, Hangzhou, San Francisco and Wuhan have hotlines that feature all-around and integrated development. Hotlines in Paris, Chengdu, New York, Shanghai, Seoul and Xi'an showcase distinctive development. Berlin, Toronto, Rio de Janeiro, Madrid, Nanjing and Hong Kong represent innovative hotline development. Tokyo, London and Singapore embody inclusive development. In terms of the four dimensions, cities like Beijing, Hong Kong, Guangzhou, New York, Toronto and Xi'an

excel in process governance. Beijing, Wuhan, Seoul and Shanghai have particular strengths in collaborative governance, with notable achievements in policy, functional and platform collaboration. Cities such as Beijing, Guangzhou, Wuhan and Seoul lead in digital intelligence governance. In responsive governance, Beijing, Hangzhou, Guangzhou and Madrid demonstrate significant effectiveness.

This study is the first systematic examination of the trajectories and trends of worldwide city hotline, pioneering a governance-based framework to offer a panoramic assessment of their services and governance effectiveness. For the first time, it provides a comprehensive summary of the operational experience and models of worldwide city hotline from an international perspective. The assessment of hotline services and governance effectiveness reexamines the roles and development trends of hotlines from the perspective of urban governance. This study has identified multiple general trends, including greater emphasis on resource integration to promote systemic governance through institutional synergy, heightened focus on channel construction to achieve accessible governance through diverse integration, increased application of intelligent technologies to upgrade smart governance through technological integration, stronger emphasis on data mining to drive scientific governance through precise analysis, and more attention to citizens' feelings by practicing proactive governance through addressing issues before they are reported. These insights offer new perspectives and methods for leveraging hotlines as tools to modernize the system and capacity for urban governance, heralding a new stage of development and transformation in global urban governance and contributing valuable solutions and wisdom to urban modernization around the globe.

Contents

Chapter 1

Current State of Worldwide City Hotlines

I. Origin and Development: From Complaints Resolution to Urban Governance [7]

Worldwide city hotline have undergone a long evolution. Over decades of exploration and development, they have undergone transformative leaps — shifting from call centers to multi-channel service platforms, from single-purpose inquiry centers to collaborative service hubs, from offering passive responses to pursuing proactive detection, from downstream problem-solving to upstream issue prevention, and from stressing problem resolution to optimizing urban governance models. Through these transitions, the organizational frameworks, operational mechanisms and service modes of city hotlines have been continuously refined, enhancing service quality and effectiveness while comprehensively empowering social governance. The evolution of city hotlines can be divided into four key stages:

(1) Inception: The Era of Call Centers

In 1937, London introduced a unified emergency number, 999, marking the birth of the world's first public hotline. In 1956, Pan American World Airways launched the first large-scale call center globally, providing ticketing assistance and complaint resolution for customers. The center marked the physical debut of hotlines and was recognized as the origin of integrated city hotline services. This development heralded the era of service-oriented call centers.

In China, the establishment of the 28011 Mayor's Public Telephone in the city of Shenyang in September 1983 — the precursor to the modern 12345 city hotline — marked the beginning of telephone-based hotline interaction in the country. Following this, cities such as Wuhan and Anshan also introduced mayoral hotlines that year. From 1984 to 1989, dozens of major Chinese cities, including Chongqing, Xi'an, Zhengzhou, Guangzhou, Shenzhen, Fuzhou, Beijing, Hangzhou and Chengdu, adopted similar systems. The widespread adoption of telephones in the 1990s further expanded the mayoral hotline network across the nation.

(2) Growth: Regulated and Standardized Development

In October 1996, Baltimore, Maryland, launched the first U.S. government service hotline, 311, to address non-emergency municipal issues. In 1997, the U.S. Federal Communications Commission reserved the 311 number nationwide for such purposes.

On June 15, 1999, the Chinese city of Hangzhou renamed its mayoral hotline, originally launched in 1988 as the "24008 Mayoral Line," to the "12345 Mayoral Hotline," marking the birth of China's first city hotline with the number 12345. Ten days later, the "Notice on Launching the Unified Government Hotline Number 12345 Nationwide" was issued, officially designating 12345 as China's standardized government hotline number and initiating the standardization of the country's hotline system.

During this period, city hotlines were primarily government-led and telephone-based, leveraging dedicated numbers and establishing call centers. This marked a transition from disorderly, decentralized operations to a more standardized and regulated approach. Protocols for complaints

handling, time limits, handling procedures, and service requirements gradually became clearer, offering an effective and convenient channel for the public to seek information and file complaints. Simultaneously, the hotlines enabled the governments to gather authentic public feedback and voices in real time, playing a role in alleviating social tensions and fostering stability. These hotlines also emerged as a vital tool for innovation in government administration.

(3) Maturity: Innovation through Digitization and Diversification

In the 21st century, rapid advancements in internet technology, big data, cloud computing, the Internet of Things, and artificial intelligence (AI) enabled comprehensive technological progress of city hotlines. By leveraging technology to achieve smart upgrades in governance methods, tools and mechanisms, city hotlines were transformed into convenient and efficient service platforms, critical hubs for collaborative governance, and reliable pillars of intelligent administration. These advancements promoted process optimization, intelligent management, data connectivity and better user experiences.

In terms of digitalizing service channels, city hotlines around the world integrated various communication methods, such as telephone, multimedia and video, merging traditional phone calls with internet-based services to create an omnichannel platform. This approach enhanced the call-handling capacity of hotlines through advanced digital tools and actively aggregated data and information resources, thus strengthening overall data analysis and application capabilities and driving the digital upgrades of city hotlines. For instance, hotlines like Hangzhou's 12345, San Francisco's 311, Toronto's 311 and Seoul's 120 all expanded beyond traditional telephone services to include websites, mobile apps and social media platforms, enabling precise responses to citizens' needs.

Leveraging the momentum of government digital transformation, city hotlines further explored technological advancements and functional expansion, established unified hotline platforms and innovated broader digital ecosystems, thereby significantly enhancing the reach of government services. Call centers further evolved into comprehensive all-media platforms for both government and public services, greatly expanding the functions of city hotlines. As a case in point, Rio de Janeiro launched a new portal for its 1746 hotline, encompassing over 500 services and more than 1,000 related information resources, catering to diverse needs such as citizen requests, service inquiries and access to public information.

In terms of intelligent management processes, this development stage integrated AI technology into various aspects of hotline operations, including call reception, response, task delegation, supervision, evaluation and archiving. This facilitated the digital and intelligent upgrades of hotline applications, enabling capabilities such as smart call handling, intelligent response, automated task assignment, intelligent oversight and smart follow-ups. These advancements further enhanced the scientific management of hotlines and improved the precision and standardization of handling public complaints. For instance, Beijing's 12345 hotline has developed an intelligent reception system and a dynamic knowledge system to enable precise task delegation. Additionally, it can employ AI-powered response robots to provide policy consultation services. Similarly, Guangzhou's 12345 hotline

leverages AI, large language models and other technologies to optimize the entire service chain. It uses an intelligent voice navigation and sorting assistant to understand citizen intentions, and adopts AI-powered speech-to-text transcription, automated task assignment and intelligent quality control to create smart workstations. Moreover, it has built intelligent Q&A scenarios through tools like an intelligent knowledge bank, an online customer service system and a knowledge-following system.

(4) Transformation: Comprehensively Empowering Urban Governance

In this new phase of development, city hotlines are increasingly focused on deeper resource integration, embedding a holistic approach throughout their entire operation. The government plays a leading role, mobilizing and coordinating efforts across various departments to jointly resolve social conflicts. This approach promotes seamless connections between different levels of governance, enabling cross-regional, cross-departmental, cross-hierarchical and cross-functional coordinated management and services. By facilitating the orderly flow of governance resources and strengthening overall coordination and synergy, city hotlines lay a solid foundation for fully empowering urban governance.

At this stage, as a core driving force behind the transformation of social ecology and the innovation in urban governance, data is managed intensively through aggregation, integration and interconnectivity, empowered by intelligent algorithms. This process enables data to perform tasks such as aggregation and classification, correlation analysis, regression analysis, predictive analysis and visual presentation. Fragmented demands of various kinds are synthesized and refined. Based on this, relevant departments can deeply analyze economic and social trends reflected in hotline data, identify and monitor social issues and risks, track public sentiment in a timely manner, and detect emerging public events. This facilitates resolving problems at the grassroots level, enhances governments' capacity to sense, predict and mitigate risks, and promotes early warning, forward-looking governance and proactive governance. Data-driven perception, data-based decision-making and policy implementation informed by analytics are becoming an increasingly salient feature.

In essence, data governance and application involve delving into the social values behind city hotline data. Empowering urban governance with data has become an inherent capability and foundational strength in the transformation of city hotlines. This process enables governments to gain a systematic understanding of public needs and concerns, instead of just fragmented knowledge. It can also support refined urban governance, business environment optimization, cross-departmental sharing of data on livelihoods, and scientific government decision-making.

For instance, New York's 311 hotline values the open sharing and efficient use of hotline data. It leverages diverse data content and open formats to encourage data applications across sectors, conducting regular multi-level analyses to comprehensively monitor urban operations. Beijing's 12345 hotline maximizes the value of data by strengthening the prediction of regular and periodic urban governance issues, using these insights to guide targeted initiatives and pioneer a new paradigm of megacity governance driven by citizens' concerns. Shanghai's 12345 hotline focuses on the key concerns of its residents, enhancing data sharing and openness to promptly identify pressing issues and sensitive information. It systematically analyzes citizens' core concerns, collaborates on

uncovering problems in urban operations, and provides data support for precise urban management.

II. Challenges of Transformation: The Urgent Need to Enhance Collaborative Governance Effectiveness [7]

With the rise and development of city hotlines, their content has grown increasingly richer, their functions have continuously expanded, and their process management has become more efficient. However, looking at the trajectory of city hotline development from a global perspective, there are still multiple unresolved challenges that need to be resolved at the "crossroads" of transformation.

Firstly, there is no consensus yet on the roles of city hotlines in the new phase. As the functions of city hotlines have expanded, they have gradually evolved from simple call centers into key players in government services, becoming "navigators" of public administration, "coordinators" of complaints resolution and "gatherers" of public opinion. Entering the new development stage, city hotlines are no longer just an important channel for connecting with the public or a convenient and efficient service platform. They have also become critical hubs for collaborative governance. Yet, few city hotlines around the globe have defined their role as a "watchdog" for risk monitoring or as an "advisor" for targeted policymaking, among other more diversified roles and development directions. The potential of city hotlines to contribute to the modernization of urban governance remains to be further explored.

Secondly, there is controversy over the application level of intelligent technologies in city hotlines. Currently, new-generation technologies such as AI, cloud computing and large-scale models are rapidly evolving and gaining popularity. Cities around the world are actively exploring how these technologies can fully empower their hotlines, with the aim of enhancing intelligent coverage across the entire process of hotline services, improving service efficiency, and further optimizing resource allocation. However, the "depth" of integration between hotlines and technology has led to a reduction in the "warmth" of services. The compatibility between hotline systems and intelligent technologies remains low, with poor integration capabilities and limited application models. This has resulted in a lack of operational feasibility in many scenarios, a poor experience for hotline staff, and an overall failure to meet expectations for real-world applications. Consequently, there is more uncertainty for the future application of intelligent technologies in city hotlines.

Thirdly, the data governance of city hotlines has yet to reach an advanced stage. Leveraging hotline data to support scientific decision-making and precise governance has already become a global consensus for city hotlines. However, issues such as the absence of data standards, obstacles to data sharing, insufficient control over data quality, and limited ability to integrate and correlate data have led to an underdeveloped data governance system for hotlines. Data mining and in-depth applications remain at the initial stage, with theoretical research on hotline data analysis still in its early phases. There is still a significant gap between the current state and the goal of systematic and efficient data governance, making it difficult to fully realize the social value of hotline data. There

have been no landmark advancements in the exploration of the hotline data governance system, and a gap exists between the ideal and reality in terms of the key role that hotlines should play in urban digital governance.

III. The Chinese Approach: Whole-Process People's Democracy and Multidimensional Governance [7]

Faced with the transformation challenges in the new phase of hotline development, Chinese cities including Beijing have crafted a vivid answer centered on the principle of putting the people first. In China, hotlines are not merely a channel for problem consultation and the filing of complaints; they are a crucial means for driving improvements in urban governance capabilities, promoting government reforms, and providing an effective pathway for all citizens to deeply engage in social governance. Viewed through the lens of urban social governance, Chinese city hotlines are advancing the integration of whole-process people's democracy with multidimensional hotline governance, addressing various challengesfaced by hotlines in multifaceted, collaborative, efficient and proactive governance:

1. Achieving the joint construction and sharing of cities through extensive participation from multiple stakeholders. City hotlines serve as a communication platform for urban management departments, service agencies and the whole society. People use hotlines for consultation, assistance, and to express their concerns and suggestions. Government departments leverage hotline data to improve urban services, decision-making and governance. The consultation mechanism attracts the participation of multiple stakeholders in the social governance process, promoting information sharing among government departments, market entities, social organizations and citizens. It reduces communication costs, streamlines governance processes, facilitates dialogue, and helps build consensus on public decisions and social legislation. This leads to the sufficient provision of public services and improved social governance efficiency, creating a collaborative urban governance community where everyone participates, takes responsibility, contributes, and shares the benefits.

2. Optimizing governance resource allocation by boosting top-down and bottom-up power interactions. Government service hotlines in cities serve not only as a bridge for communication between the government and the public, but also as a fast, convenient and efficient working mechanism for governments' internal coordination, inter-departmental collaboration and seamless integration.

In Beijing, the municipal government has established a working mechanism of community-based whistleblowing and interdepartmental coordination through the 12345 government service hotline. This system encourages functional departments to go to grassroots levels and facilitates the integration of management forces. Urban management, safety supervision and other departments gradually deploy personnel to sub-districts and townships, while coordinating the efforts of various departments. This creates a collaborative governance model where township-level and county-level departments work seamlessly together like gears in the face of tough issues, ensuring efficient

integration and utilization of resources to provide more accurate and refined public services.

3. Linking governance policies with democratic practices through closed-loop management. The main work procedures of city hotlines involve receiving calls, dispatching tasks, prompt resolution, and supervision and evaluation. Receiving calls provides a platform to listen to the public's voices and understand their concerns. Dispatching tasks creates a top-down and inter-departmental coordination system within the government. The prompt resolution phase ensures a governance model that fully incorporates public opinion and offers convenient services. The supervision and evaluation phase establishes a mechanism for transparent government operations and broad public oversight.

The workflow of the city hotlines is seamlessly integrated with various democratic processes. The practical goal is to integrate public opinion, with multi-stakeholder participation as the core value and effective oversight as the basic requirement. This creates a dynamic closed-loop process for accurately identifying public opinion, absorbing it effectively, gathering collective wisdom, and fully implementing the will of the people, thereby improving the quality and efficiency of urban governance.

Chapter 2

Worldwide City Hotline Services and Governance Effectiveness Evaluation System

I. Research Background and Evaluation Significance

(1) The Necessity of Hotline Service and Governance Effectiveness Evaluation

In the era of rapid global digital and intelligence development, city hotlines[1] are experiencing unprecedented opportunities for development. Service-oriented governance model and good governance model enable meaningful government-citizen interactions; digital technologies, such as big data and artificial intelligence, provide paths for the intelligent upgrading and modern governance of city hotlines. As an important channel connecting the government and citizens, city hotlines integrate resources from various entities and departments to provide onestop services, deliver responses, and address citizens' urgent, difficult, and worries.

At present, worldwide city hotline play an increasingly important role in providing consultation, solving difficult problems, and improving service quality. They not only reflect the government's ability to respond quickly and efficiently to citizens' needs and optimize public service processes, but also serve as an essential channel for advancing the modernization of urban governance. It can be said that the high-quality development and efficient operation of city hotlines have made positive contributions to improving citizens' quality of life, enhancing government credibility and transparency, and promoting social harmony and stability. However, in reality, cities around the world have varying understandings of hotlines, and the trends and effectiveness of their development show significant differences. These differences directly affect the improvement of public service quality, the governance image of hotline institutions, and citizens' trust and satisfaction.

Based on this, it is necessary to conduct a services and governance effectiveness evaluation of city hotlines, which can provide a scientific foundation for continuously improving city hotline service processes, optimizing resource allocation, and enhancing governance effectiveness. It is also beneficial to discover and promote innovative practices and best experiences from advanced city hotline services, offering valuable data and experience to support the development of urban governance—particularly in the areas of professionalism, collaboration, modernization, and intelligence through city hotlines. More importantly, introducing an international comparative and cross-domain evaluation perspective would allow for a deeper understanding of the development trends of city hotlines in the sense of mutual learning among civilizations, summarize the best practices of city hotline governance from both China and abroad, and contribute urban good governance solutions to building a community with a shared future for mankind.

1. City hotlines are divided into two categories: emergency and non-emergency hotlines. The object of this evaluation focuses on city non-emergency hotlines. Emergency hotlines refer to telephone numbers that the public can dial in urgent situations, such as crime, fire, medical emergencies, or other situations requiring immediate assistance, to quickly obtain help. Non-emergency hotlines, on the other hand, are used to address issues that do not involve immediate threats to life or property loss, providing the public with a channel to submit inquiries, requests for assistance, complaints, reports, and suggestions to government departments. In actual requests for help, citizens often blur the distinction between emergency and non-emergency hotlines, using a combination of channels to seek help and express their demands.

(2) Existing Research and Limitations of Hotline Evaluation

Currently, major global city hotline evaluations include the US 311 hotline evaluation, the EU 112 hotline evaluation, and several city hotline service quality evaluations, and several city hotline service quality evaluation conducted by Tsinghua University Center on Data and Governance (hereinafter referred to as Tsinghua CDG) and its partners.

Among these, the US 311 hotline evaluation system implemented in 2009 is relatively more developed. This indicator system includes four first-level indicators: Usability, Services, Operations, and System Measures, covering a broad range of indicators.

The EU 112 hotline is a unified emergency hotline number for EU member states. Since 2007, the European Commission has collected information from its member states and candidate countries through questionnaires. This evaluation includes three first-level indicators: "Calls", "Caller Location", and "Access to Emergency Services" to examine the development of hotlines across the EU.

The "2024 National Government Hotline Service Quality Assessment Index", conducted by Tsinghua CDG and its partners, covers three first-level indicators: "Service Channels", "Service Experience", and "Overall Perception". The "2023 National Government Hotline Service Quality Assessment Report", jointly released by the Sun Yat-sen University Center for Digital Governance, Tsinghua CDG, and China Economic Information Service, includes two first-level indicators: "Goal Achievement" and "Process Experience". In addition, the "12345 Government Service Convenience Hotline Third-Party Evaluation General Rules" (2022 edition), developed by the Commerce Statistical Society of China, includes four first-level indicators: "Service Response", "Service Standards", "Problem Solving", and "Method Innovation".

Combining the indicators of the above evaluation systems, it becomes clear that existing evaluation indicator systems have limitations. Most of them focus primarily on call answering, dispatching, and feedback process, with little emphasis on governance indicators such as the process, outcomes, and public evaluation of demand handling.

(3) Practical Value of Hotline Effectiveness Evaluation

Conducting an evaluation of worldwide city Hotline services and governance effectiveness offers conceptual support and a knowledge base for improving government service efficiency, enhancing citizen satisfaction, promoting technology integration and application, and driving innovation in urban governance . Specifically, conducting such an evaluation has the following practical benefits.

First, it improves citizens' sense of fulfillment and satisfaction. With the increasing diversification and personalization of citizen needs, city hotlines need to continuous innovative service models and processes to meet them. A scientific and systematic evaluation can accurately assess the performance of hotlines and related departments in terms of service attitude, professional ability, problem-solving, etc., perceive changes in citizens' satisfaction and cognition of city hotlines, reveal shortcomings in the governance process, and prompt the government to continuously optimize service processes and governance strategies, enhancing citizens' sense of gain and satisfaction.

Second, it helps to improve urban governance effectiveness. It serves as both a performance evaluation for city hotlines and an indicator of urban governance effectiveness. The evaluation of worldwide city hotline can clarify the differentiated performance of various city hotlines in terms of service standards, response quality, problem-solving, etc. This motivates cities to learn from each other, complement each other's strengths and weaknesses, stimulate innovative thinking, and promote the innovation of service models and governance methods. At the same time, promoting improvement and excellence through evaluation will drive the continuous optimization of city hotlines and even the entire urban governance system, providing a strong basis for enhancing the efficiency of urban governance.

Third, it promotes the integration, application, and iteration of technology. Driven by the digital wave, cutting-edge technologies such as big data and artificial intelligence are being widely applied to city hotlines, reshaping their service models and operation mechanisms. A scientific and systematic evaluation is not only a test of the existing technology application effects but also a catalyst and guide for the in-depth application of new technologies. By quantifying the specific contributions of digital technology in data governance, technology integration, and scenario application, it provides possibilities for the further promotion, application, and iteration of cutting-edge technologies in city hotlines.

Fourth, it fosters the innovation and diffusion of urban governance. The worldwide city Hotline services and governance effectiveness evaluation is not only a "mirror" but also a "bridge", building an international platform for cities around the world to share experiences and exchange knowledge. This cross-regional and cross-cultural comparative analysis injects new vitality and inspiration into urban governance innovation. Through systematic and multi-dimensional comparative studies, it can deeply analyze the successful experiences and innovative practices of different countries and cities in utilizing city hotlines. This fosters the global exchange of best practices and innovative governance strategies for city hotlines, promoting the global sharing and dissemination of advanced concepts and innovative experiences in city hotline governance.

II. Design Approach and Construction Implications [7]

The worldwide city Hotline services and governance effectiveness evaluation consists of four first-level indicators: Hotline Process Governance, Hotline Collaborative Governance, Hotline Smart Governance, and Hotline Responsive Governance, collectively referred to as the Hotline 4G Evaluation System.

(1) Theoretical Basis for Indicator Design

The construction of the Hotline 4G Evaluation System is based on classic and modern governance theories, including whole-process governance, collaborative governance, holistic governance, and responsive governance. These theories provide solid academic support and practical guidance for the evaluation system.

First, whole-process governance ensures efficient management across all stages, from request registration to issue resolution, achieving systematic and continuous governance. This theory emphasizes a governance cycle encompassing problem identification, solution implementation, and outcome assessment, forming a closed loop. In the context of city hotline, it is mainly manifested as the establishment of a systematic and complete demand-handling mechanism, including an efficient demand acceptance system, scientific assignment and hosting process, and standardized demand processing standards. The whole-process governance theory guides hotline service to build a complete service chain from answering to solving, ensuring that every link is managed in detail, ultimately achieving efficient resolution of demands and enhancing citizen satisfaction.

Second, the collaborative governance theory emphasizes cooperation and interaction among multiple stakeholders, achieving common goals through resource integration and information sharing. This theory believes that when facing complex social issues, a single department or institution may not be able to cope independently, and it is necessary to establish cross-departmental and cross-level collaboration mechanisms. For hotline services, the collaborative governance concept fosters the establishment of horizontal and vertical collaboration networks, including policy-level coordination, functional department collaboration, and integration and docking with other service platforms. City hotlines are required to be not only a "reception point" of citizens' demands but also a core "hub station" that links various resources, promoting information flow, resource sharing, and collaborative action.

Third, the holistic governance theory advocates for breaking down departmental barriers, integrating various resources, and achieving systematic and integrated governance. This theory emphasizes the need to view and address problems from a holistic perspective, highlighting the interconnection and overall effect of various governance elements. In the case of hotline services, holistic governance is reflected in the deep integration of data, technology, applications, and decision-making. It requires the establishment of a unified data governance system, promotes the in-depth application of technology in various areas, and realizes precise governance through scenario-based applications and supportive decision-making. This holistic perspective guides hotline services from a single problem response to a global urban governance, providing comprehensive and systematic support for urban governance decision-making through data-driven and intelligent analysis.

Fourth, the responsive governance theory stresses a public-centered approach, where the ultimate purpose of urban development is to meet the growing needs of the public for a better life. This theory requires urban governance to be grounded in real public needs and improve public participation and satisfaction. In hotline services, responsive governance emphasizes addressing diverse group needs through an inclusive service system. It requires hotlines not only to pay attention to the interaction experience with the public and provide convenient channels for demands, but also to ensure that demands are effectively resolved and continuously improve service quality through continuous evaluation and improvement. The responsive governance theory guides hotline services to become an important bridge connecting supply institutions and citizens' demands, truly achieving people-oriented urban governance.

Aligned with four governance models, the four first-level indicators in the Hotline 4G Evaluation

System reflecting distinct approach to urban governance, separately. The Hotline Process Governance indicator reflects the function-active model, emphasizing that city hotlines actively discovers and solves problems through the full play and improvement of specific functions in its own series of processes, enhancing the agility, effectiveness, and foresight of hotline governance. The Hotline Collaborative Governance indicator reflects the source-tracing-collaboration model, focusing on the fact that the handling of hotline demands may require collaboration and coordination between departments and levels, starting from the source of the problem for radical treatment, and in normal governance, it should also collaborate with existing other platforms and emergency hotline platforms to help achieve source governance and evidence-based governance. The Hotline Smart Governance reflects the benchmark-setting model, using hotline data mining to explore difficult governance issues and high-frequency common problems in different scenarios, identifying and diagnosing difficulties, focusing on centralized governance, setting scene governance optimization plans and goals for the city, and gradually promoting the modernization of urban governance. The Responsive Governance reflects the circular-response model, with urban governance ultimately centered on the public, emphasizing the direct and timely advantages of the hotline in responding to citizen demands, ensuring efficient and precise governance of citizen demands through effective government-civilian interaction response mechanisms, providing a practical basis for participatory governance of whole-process people's democracy.

(2) Indicator System Design Approach

Four first level indicators help he Hotline 4G Evaluation System to achieve four major goals. First, standardized governance based on the hotline. This involves optimization, standardization, specification, and efficiency of hotline governance to improve the high-quality development of worldwide city hotline. Second, extended governance through the hotline. The hotline should play a leading role in internal government governance. By integrating elements such as levels, departments, and platforms, the hotline governance should extend to the collaborative improvement of government internal functional departments and local governance, promoting the restructuring of bureaucratic structures. Third, policy-based governance supported by the hotline. The hotline should leverage the effectiveness of digital governance and technology integration, providing scenario-based governance plans and policy support for the modernization of urban governance. Fourth, response-based governance driven by the hotline. Based on standardized governance, extended governance, and policy-based governance, the hotline should ultimately achieve response-based governance focused on citizen needs, through perceiving the diverse, personalized, and characteristic needs of citizens, providing refined, precise, and agile services, and actively contributing to the construction of a responsive city in the intelligent era. The 4G indicator system assigns weights to the first-level indicators according to their importance: Process Governance (20%), Collaborative Governance (25%), Smart Governance(30%), and Responsive Governance (25%). The weights for the second-level and third-level indicators are detailed in Table 2-1.

Table 2-1:The Hotline 4G Evaluation Indicator System

First-level Indicators	Second-level Indicators	Third-level Indicators
Process Governance **【20%】** whole-process governance theory function-active model	Appeal Acceptance **【10%】**	Call Answer Rate: The ratio of the number of calls answered by the operator to the total number of calls received throughout the year
		Channel Diversity: Whether there are multiple channels, including telephone, app, mini-program, or web platform, etc.
	Appeal Transfer **【10%】**	Appeal Traceability: Is there a unique identification number that callers can use for future communication and inquiries
		Work Order Dispatch Manual: Is there a work order dispatch manual for the hotline when transferring inquiries
Collaborative Governance **【25%】** collaborative governance theory source-tracing-collaboration model	Policy Collaboration **【5%】**	Strategic Planning: Is there a specific strategic development plan for the hotline
		Standard Specification: Is there a standard specification document for the development of the hotline
	Function Coordination **【10%】**	Levels of Coordinated Supervision Leadership: The highest levels of coordinated supervision leadership
		Inter-departmental Collaboration Mechanism: Is there a mechanism for inter-departmental collaboration
	Platform Collaboration **【10%】**	Hotline Integration: Has this non-emergency hotline merged with other hotlines
		Coordination with Emergency Hotlines: Does the hotline have a coordinated working mechanism with emergency hotlines

First-level Indicators	Second-level Indicators	Third-level Indicators
Smart Governance **【30%】** holistic governance theory benchmark-setting model	Data Governance **【10%】**	Data Management: Is there a unified management system for hotline data
		Data Openness: Does this hotline have the following data openness policies, Including open sharing of hotline data among different government departments, opening hotline data to third-party research institutions, making hotline data publicly accessible, opening hotline data to the business sector
	Scenario Application **【10%】**	Scenario List: Does the hotline have a list of difficult and complicated projects for urban scenario-based governance
		Scenario-based Services: Quantity of scenario-based services or governance cases that employ hotline data
	Decision-making Support **【10%】**	Types of Reports: Are there daily, monthly, quarterly, annual, and special reports based on the analysis of hotline data
		Leadership Level for Utilization of Reports: At which leadership level are reports derived from hotline data analysis accepted and utilized

First-level Indicators	Second-level Indicators	Third-level Indicators
Responsive Governance **【25%】** responsive governance theory circular-response model	Inclusive Service 【13%】	Service Coverage: To evaluate the service coverage of the city hotline, the ratio of hotline calls to the local population is calculated
		Adaptive Services: Does the hotline provide 24-hour full-day service, aging friendly services, emergency services in special situations and accessibility services for disabilities and other special groups
		Waiting Time: How long is the average waiting time for the public when dialing a phone call before it gets connected
	Overall Evaluation 【12%】	Proficiency of Call Center Agents: How would you rate the proficiency of the call center agents when you dial the hotline
		Professionalism in Solving Appeal: Have the reported complaints been resolved professionally
		Effectiveness in Solving Appeal : Have the reported complaints been completely resolved
		Trust in the Hotline: How much do you trust the non-emergency hotline in your city
		Satisfaction with the Hotline: How satisfied are you with the city's non-emergency hotline

(3) Implications of Indicator System Construction

From the perspective of the relationships between indicators, the four first-level indicators of the Hotline 4G Evaluation System systematically explain the relationships between complaints and handling, complaints and governance, complaints and policy, and complaints and public perception.

The Hotline Process Governance indicator reflects the relationship between complaints and handling, assessing the efficiency and effectiveness of the hotline in addressing citizen complaints. It evaluates both the process and outcomes of complaints management through indicators including complaint acceptance, transfer, handling, and assessment. The Hotline Collaborative Governance indicator focuses on the relationship between complaints and governance, illustrating how the hotline achieves closed-loop management from problem feedback to assessment and incentivization. This is accomplished through policy collaboration, cross-level collaboration, cross-department collaboration, and platform collaboration. The Hotline Smart Governance indicator addresses the relationship between complaints and policy, emphasizing the hotline's role in providing practical references for scenario-based governance. It enhances decision-making for urban governance by integrating digital technology. Lastly, the Hotline Responsive Governance indicator explores the relationship between complaints and public perception. It focuses on citizens' experiences and emotional reactions to the service provided by the hotline, measuring the perception of citizens in the interaction with the hotline through process indicators of hotline service handling and problem resolution.

From the perspective of driving forces, the construction of the Hotline 4G Evaluation System is guided by four drivers: process optimization, structure reshaping, system reshaping, and people-centered orientation. Each of these drivers is reflected in the system through corresponding indicators on the supply side, function side, policy side, and demand side..

The Hotline Process Governance indicator is primarily based on process optimization considerations, focusing on the supply side. This indicator reflects the efficiency and effectiveness of the city's hotline services, with a goal of improving the service response and complaint handling quality of the hotline through optimizing the internal processes and resource allocation of the hotline The Hotline Collaborative Governance indicator is mainly driven by structure reshaping considerations, focusing on the functional side of governance. It highlights the role of the hotline in the urban governance structure, aiming to promote the realization of extended governance functions based on the hotline through playing a hub and collaborative role in different policy norms, level governance, departmental governance, and platform governance. The overall governance indicator is mainly based on system reshaping considerations, focusing on the policy side. It emphasizes the auxiliary role of the city hotline in various governance scenarios and decision support, providing a scientific basis for urban governance through data-driven and intelligent analysis. Finally, the Responsive Governance indicator is designed to be people-oriented, focusing on the demand side. It stresses the importance of meeting the diverse needs of citizens, addressing citizens' urgency, difficult, and worrying problems and enhancing their satisfaction and sense of well-being.

III. Evaluation Methods and Data Processing [7]

(1) Principles for Selecting Cities

The project team initially selected more than 200 cities worldwide for comprehensive examination and applied the following principles for further selection.

First, the degree of internationalization. This refers to internationally recognized indicators such as the Global City Competitiveness Index (GCI) and the Global City Power Index (GPCI).

Second, the maturity of hotline development. This principle considers the historical development, innovation level, and development stage of city hotline services in different countries.

Third, urban functions. Cities are selected based on their multi-functional roles, including political, economic, and cultural centers, as well as other major metropolitan functions.

Fourth, geographical distribution. To ensure global diversity, cities are chosen from different continents—North America, Europe, Asia, and South America. For cities in Mainland China, their geographical coverage within the country is also considered.

Fifth, global influence. Cities selected are those with significant global or regional influence in areas such as economic, political, scientific, and cultural exchanges.

Sixth, the availability of hotline operation data. The selected cities must have open data channels for accessing information related to their hotline operations and public user interactions.

North America: New York, San Francisco, Toronto;

Europe: Berlin, Paris, Madrid, London;

Asia: Singapore, Seoul, Tokyo, Beijing, Shanghai, Guangzhou, Wuhan, Hangzhou, Chengdu, Nanjing, Xi'an, Hong Kong;

South America: Rio de Janeiro.

(2) Data Collection and Analytical Methods

The objective measurement of hotline data analyzed in the indicator system is an innovative highlight and a key challenge of this evaluation. To ensure sufficient data for assessing the service and governance effectiveness of worldwide city hotline, several methods, including questionnaires, interviews, and online searches, are employed to collect relevant data.

Firstly, structured interviews with hotline institutions. With city hotline institutions as the evaluation subjects, these interviews (including face-to-face and telephone) gather data on a range of indicators regarding the service quality and governance of city hotlines. The project team prepares a structured interview outline in advance for questioning. Interview experts follow up appropriately based on the respondents' answers, recording answers related to hotline process governance, collaborative governance, and smart governance. This process forms a comparable structured database for each

city, which is then analyzed through descriptive statistics and correlation analysis. Structured interviews with hotline institutions provide detailed insights into operational performance, service quality, and governance challenges. Interview experts receive training to ensure the standardization and consistency of the structured interview process.

Secondly, citizen survey. With the public who have received city hotline services in 20 international metropolises as the survey respondents, data is collected through online questionnaires. Based on the statistical characteristics of the population in each city, the survey gathers feedback on hotline accessibility, problem resolution, and overall user satisfaction. The main steps include: first, operationalizing the responsive governance-related indicators and making adjustments through internal testing; second, conducting a small-scale pre-test before the formal survey to check the understandability, logic, and operability of the questionnaire, and making corrections based on feedback; third, using urban quota sampling to design the sample size for each city and carrying out large-scale online surveys; finally, excluding invalid data, standardizing and scoring the data, and incorporating it into the indicator system for calculation and analysis.

Thirdly, online big data mining. The project team conducts consistency checks and quality control through big data mining methods. Big data mining primarily targets the collection of relevant data from the official websites of hotline institutions, news reports, research reports, and other relevant online sources, supplementing the missing values from structured interviews with hotline institutions. At the same time, it collects user evaluation data from social media platforms such as Facebook, WeChat, Weibo, and others, supplementing the missing values from public user-side questionnaire surveys. The data is collected using keywords based on the indicator system, structured interview outline, and questionnaire. In addition, evaluators are recruited to trace and verify all policies, reports, and news data and texts of the evaluated cities. Evaluators, who are primarily graduate students trained in systematic data collection, follow a detailed operation manual to ensure that the quality control process for each indicator data is standardized, normalized, and simplified. A management chain consisting of teachers, supervisors, and team leaders ensures accountability and oversight throughout the process.

Fourthly, expert interviews. The main purpose of expert interviews is to gain in-depth insights into the internal operation mechanisms, problem-solving processes, and innovative practice cases of city hotline services, to obtain deep insights into the service quality and governance effectiveness of hotlines, and to improve the construction of the indicator system. Through teachers or experts from universities or related fields in various countries, in-depth interviews are conducted with managers or staff of hotline services. The interviews explore consensus and differences on key topics, analyze typical cases, and extract valuable lessons and experiences. The insights gained from these interviews are used to provide actionable recommendations for improving the hotline system, help explain the evaluation indicator data, identify areas for future improvement, and guide decision-makers.

Fifthly, indicator weight assignment. Reasonable weight assignment for the indicator system is key to ensuring the scientific validity and reliability of the evaluation results. Objective weighting methods, such as the entropy method, are employed to perform quantitative analysis based on the degree of dispersion and other objective characteristics of the indicator data, providing a reference

for weight distribution. Building on this foundation, the research team organized expert seminars to further optimize the weight settings using subjective weighting methods, such as the Delphi method. By inviting scholars with experience and expertise in relevant fields, as well as hotline service managers, multiple rounds of opinion collection and discussion on weight assignments are conducted. This iterative process ensures that the weight distribution aligns closely with the practical conditions of the indicators for hotline services and governance.

(3) Data Calculation Process

The calculation of evaluation indicator data for worldwide city hotline services and governance effectiveness involves a series of important tasks, including data cleaning and standardization processing, data verification and missing value imputation, indicator quantification and weight calculation, and comprehensive scoring calculation of grade indicators.

First, data cleaning and standardization processing. This step cleans the collected raw data and removes duplicate, erroneous, or invalid data. The completeness, consistency, and accuracy of the data must be checked to ensure that it meets the requirements for analysis. For data from different sources and formats, standardization is applied to ensure comparability. For example, for the statistics of service response time, it is necessary to unify the unit of measurement (such as seconds, minutes) .

Second, data verification and missing value imputation. This step verifies and checks the cleaned data for consistency. For any missing data, online big data mining and verification results are used to fill in the gaps. If data is still missing, the average value of each indicator's non-missing values is calculated and used to impute the missing values. By filling in the missing values, the sample size of the dataset will not be reduced, providing enough samples for subsequent analysis.

Third, indicator quantification and weight calculation. According to the nature of the third-level indicators, for indicators that can be directly quantified, scores are assigned based on their actual values; for indicators that are difficult to directly quantify, scores are assigned based on predefined grading standards. Then, each indicator's score is then weighted according to its assigned weight, allowing the calculation of specific scores for each city on each third-level indicator.

Fourth, comprehensive scoring calculation of grade indicators. In a comprehensive evaluation system composed of multiple indicators, the weighted average method is used to calculate the comprehensive score, that is, the scores of each indicator are weighted according to their importance and weight. The calculation follows the process of "third-level indicator data collection → calculation of third-level indicator scores → calculation of second-level indicator scores → calculation of first-level indicator scores → calculation of city hotline service and governance effectiveness scores", and the specific calculation steps are shown in the figure below.

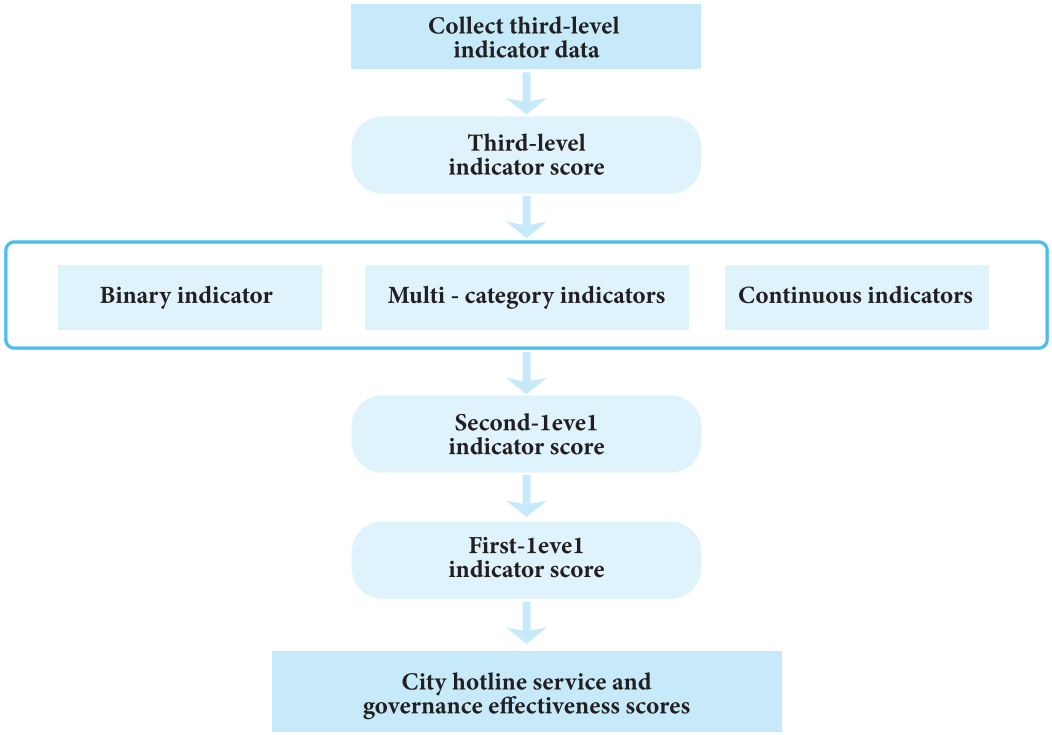


Figure 2-1: Index Calculation Flowchart

The score of the third-level indicator needs to be calculated according to its classification. If the third-level indicator is binary (i.e., 0 or 1), a score of 1 corresponds to the indicator's weight. For multi-category indicators (such as the decision support report formed based on hotline data analysis includes daily, monthly, quarterly, annual, and special reports in five categories) or continuous indicators, normalization is performed to convert the values into a range of 0 to 1. The normalization process is shown in Formula (1).

$$x' = \frac{x - \min(x)}{\max(x) - \min(x)} \qquad \text{Formula(1)}$$

In Formula (1), x represents the actual value of the indicator, min(x) and max(x) are the minimum and maximum values of x, respectively. Through the transformation of Formula (1), x is normalized with a new range of 0 to 1. The weighted score of the third-level indicator of a multi-category or continuous type indicator can be represented by Formula (2):

$$\text{The weighted score of the third} - \text{level indicator} = x' \cdot \text{The weight of the third} - \text{level indicator} \qquad \text{Formula(2)}$$

After obtaining the weighted score of the third-level indicator, the weighted scores of all third-level under the same second-level indicator are summed to calculate the second-level indicator's score. The weighted score of the second-level indicator can be represented by Formula (3):

$$\text{The weighted score of the second} - \text{level indicator} = \sum \text{The weighted score of the third} - \text{level indicator} \quad \text{Formula(3)}$$

Similarly, the weighted scores of all second-level indicators under the same first-level indicator are summed to obtain the weighted score of the first-level indicator, as shown in Formula (4):

$$\text{The weighted score of the first} - \text{level indicator} = \sum \text{The weighted score of the second} - \text{level indicator} \quad \text{Formula(4)}$$

Finally, the weighted scores of all first-level indicators are summed to obtain the total score of the entire evaluation system, as shown in Formula (5):

$$\text{The total score of the entire evaluation system} = \sum \text{The weighted score of the first} - \text{level indicator} \quad \text{Formula(5)}$$

After the data processing and scoring are completed, the next step is to analyze the results. The main purpose of this analysis is to reveal the patterns and trends behind the data, providing scientific evidence for improving and optimizing hotline services and governance. By conducting thorough data processing, scoring, and in-depth analysis, a comprehensive and objective evaluation of hotline service and governance effectiveness is achieved. This evaluation provides essential insights that can guide improvements in service quality and enhance the overall governance of city hotlines.

Chapter 3

Analysis of Results from the Evaluation of Worldwide City Hotline Services and Governance Effectiveness

I.Overall Analysis [7]

(1) Cluster Analysis Based on Hotline Development

Cluster analysis uses computational techniques to group data samples, revealing underlying patterns. Applying cluster analysis to survey data reveals that worldwide city hotline currently present four major categories, which can be designated as Integrative, Distinctive, Innovative, and Inclusive hotlines.

Integrative hotlines are characterized by high integration, comprehensive coverage, and efficient coordination. Through one-stop services and internal coordination mechanisms, they achieve rapid responses to citizen appeals and precise governance. Distinctive hotlines adopt localized approaches, providing tailored professional services based on the city's development and citizens' needs to meet the diverse demands of various groups. Innovative hotlines are centered on technological empowerment, emphasizing innovation in service models and data openness, thereby advancing the modernization of urban governance. Inclusive hotlines are distinguished by diverse approaches, multi-channel accesses, and rapid responses, aiming to comprehensively address urban governance issues and effectively resolve them.

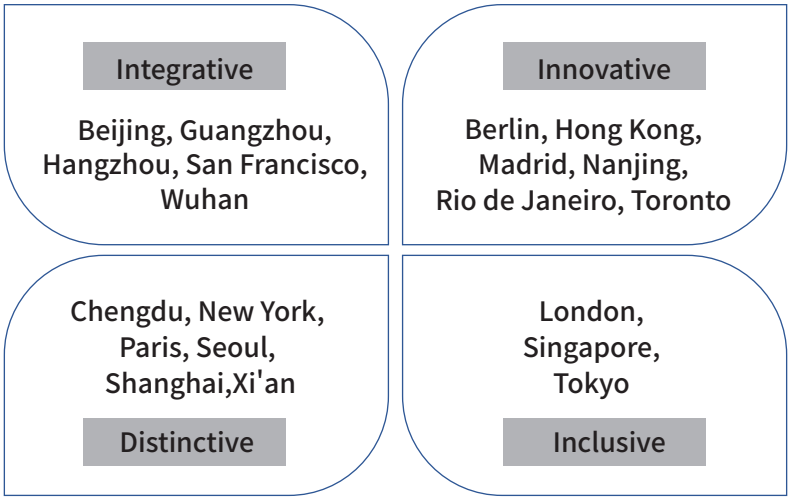


Figure 3-1: Cluster Distribution of City Hotline Development

1. Integrative Hotlines

Integrative hotlines exhibit characteristics of high integration, comprehensive coverage, and efficient coordination. Beijing serves as the exemplar of this model, with cities such as Guangzhou, Hangzhou, San Francisco, and Wuhan also displaying similar attributes, representing the common traits of integrated hotlines.

First, the primary feature of integrative hotlines is the high degree of resource integration and one-stop service, consolidating multiple government department hotlines under a unified number, which enables citizens to address a variety of issues with one single call. For instance, the Beijing's 12345 hotline and similar hotlines in other cities have evolved from single-call services into convenient and efficient service platforms, showcasing exceptional resource integration capabilities. San Francisco's 311 hotline integrates multiple channels, including websites, apps, and social media platforms, to provide the public with convenient and diversified interaction and services.

Second, comprehensive coverage is demonstrated by the broad service scope of integrative hotlines, encompassing all aspects of citizens' daily lives, such as consultation, appeals, suggestions, and emergency reports. In handling citizen appeals, the Beijing's 12345 hotline has pioneered a scientific classification and handling mechanism. By leveraging a three-tier dispatch directory with over 2,000 standardized issues, it achieves precise classification and rapid distribution of appeals. The hotlines in Guangzhou, Wuhan, and Hangzhou, through the application of intelligent technologies, have further clarified their service scope and coverage.

Third, efficient coordination refers to the capability of city hotlines to ensure that citizen appeals are swiftly directed to the relevant departments and promptly addressed through highly efficient internal coordination mechanisms. The Beijing's 12345 hotline exemplifies this by implementing a "one-stop" citizen complaint response system that enables rapid inter-departmental coordination. In terms of governance measures, Beijing has innovatively launched a "complaints + grids" integrated governance model, deeply integrating the hotline with the city's grid-based management system. This integration facilitates proactive identification and preemptive resolution of citizens' urgent and complex problems. Integrative hotlines also emphasize collaboration with external organizations. For example, San Francisco's 311 hotline utilizes an open data platform to foster interaction and sharing between the public and the government.

In summary, integrated hotlines, represented by Beijing, excel in high integration, comprehensive coverage, and efficient coordination. Through technology-driven, data-driven, and service-optimized approaches, these hotlines continuously enhance the efficiency and quality of urban governance, achieving rapid responses to and precise management of citizen appeals. Integrated hotlines serve as a valuable model for other cities, demonstrating how to optimize hotline processes, strengthen cross-departmental coordination, leverage smart governance technologies, and establish effective government-public interaction mechanisms, thereby advancing the high-quality development of hotline services.

2. Distinctive Hotlines

Tailored to provide city-specific services tailored to local urban development and citizen needs, distinctive hotlines are characterized by their adaptability to certain circumstances. These hotlines excel at swiftly responding to citizens' demands while fostering continual innovation. Paris, Chengdu, New York, Shanghai, Seoul, and Xi'an serve as exemplary representatives.

In terms of professional services, distinctive hotlines typically offer targeted services for specific fields or groups. Chengdu's 12345 hotline, through its "Qinqing Online" service brand, highlights the

city's commitment to improving the business environment. By integrating multi-channel linkages and data-driven decision-making, it provides robust support for government decision-making. Seoul's 120 hotline, as a public service platform for the city, showcases its openness and inclusiveness as a global metropolis through diversified service channels and an international cooperation framework. The hotline provides multilingual services and collaborates with international organizations, innovating its service model to meet the needs of diverse citizen groups while enhancing Seoul's international image. Similarly, Shanghai's 12345 hotline, representing the city's modernization and digital transformation, demonstrates its intelligence and professionalism. By leveraging digital transformation and in-depth data analysis, it supports urban governance decisions and enhances its decision-making capabilities.

Regarding innovative practices, distinctive hotlines often lead in exploring new service models and technological applications. Xi'an's 12345 hotline, as the city's public service platform, integrates multi-source data and employs advanced modeling and data-mining techniques to support the resolution of livelihood issues and optimize social governance. Its proactive approach, enabled by data feedback mechanisms, has shifted service delivery from reactive to proactive, modernizing governance capabilities at the district and county levels. A hallmark of New York's 311 hotline is its emphasis on data openness and efficient utilization. By establishing a comprehensive data management system and encouraging collaboration among government and diverse societal stakeholders, the hotline maximizes the governance value of its data. This open data strategy provides citizens, researchers, and developers with a platform for exploration and experimentation, leveraging collective intelligence to enhance urban services and improve public policies.

In summary, distinctive hotlines excel at tailoring optimizations and innovations to meet the unique characteristics and developmental needs of their cities. They not only provide convenient services to diverse groups but also enhance governance efficiency and service quality, reflecting the distinctive charm of each city's hotline service.

3. Innovative Hotlines

Based on the trends in hotline development, innovative hotlines demonstrate advantages in technological empowerment and open collaboration. Cities such as Berlin, Toronto, Madrid, Nanjing, Rio de Janeiro, and Hong Kong exemplify innovation, utilizing advanced technology to improve hotline services while demonstrating openness and cooperation.

First, innovation of technology and service. Innovative hotlines leverage advanced technologies such as big data, artificial intelligence (AI), and natural language processing (NLP) to achieve intelligent service transformation. For instance, Nanjing's 12345 hotline has implemented intelligent voice and text customer service systems, significantly improving the response speed and accuracy of hotline services. Additionally, Nanjing's hotline has introduced intelligent dispatching and follow-up applications, further enhancing service efficiency and quality. Similarly, Hong Kong's 1823 hotline leverages NLP and machine learning technologies to significantly improve call connection rates, enabling intelligent service transformation.Berlin's 115 hotline incorporates intelligent voice dialogue systems and chatbots to provide 24/7 service, enhancing the efficiency of appeal handling. Toronto's 311

hotline utilizes GPS technology for precise localization of service requests and offers real-time online chat and knowledge base features, ensuring that citizens can access help anytime and anywhere. Madrid's 010 hotline, through the Decide Madrid online platform and social media, collects citizens' feedback to analyze public opinion trends and service satisfaction. This information guides policymaking and service improvements. This approach not only increases citizens' engagement but also ensures service enhancements closely align with public needs.

Second, open collaboration. Innovative hotlines establish information exchange channels to enhance service quality through collaboration. Rio de Janeiro's 1746 hotline emphasizes full-process transparent management by providing citizens' feedback channels, setting clear service deadlines and quality standards, and conducting data tracking and analysis. Government departments can monitor their performance metrics in real time and make continual improvements based on citizens' feedback. Nanjing's 12345 hotline, adhering to principles of collaborative governance, collaborates with experts, scholars, and think tanks to delve into key demands in public service fields, transforming hotline data into actionable policy recommendations.

In conclusion, innovative hotlines are centered on technological empowerment and exhibit exemplary effects in technology and service innovation. Their development features, such as technological innovation and open collaboration, enable them to meet citizens' needs better, improve the quality and efficiency of government services, and promote the modernization of urban governance processes.

4. Inclusive Hotlines

Inclusive hotlines are typically characterized by diverse approaches and rapid responsiveness, which enable them to better meet citizens' needs and facilitate communication and interaction between governments and the public. The inclusive features of city hotline platforms in Singapore, London, and Tokyo can be analyzed from the following three aspects.

First, multi-channel expansion and exploration. Singapore's OneService platform integrates various service channels to provide citizens with extremely convenient access. Notably, the platform innovatively embeds its OneService Kaki chatbot into mobile social platforms, allowing citizens to interact seamlessly without having to download additional applications. This multi-channel access approach not only enhances the accessibility of the hotline but also significantly improves the convenience for users.

Second, public participation and feedback. The Greater London Authority platform actively encourages citizen participation and feedback by offering channels to contact the Mayor and council members, as well as opportunities to participate in consultations and surveys through its website. These mechanisms enable the government to gather public opinions and suggestions, incorporating them into service improvement and policymaking processes. Similarly, Tokyo's "Voice of Citizens" platform retains traditional channels such as in-person visits, fax, and postal mail for collecting public feedback. The platform regularly compiles citizens' suggestions, opinions, and requests into monthly and annual reports, providing valuable references for the analysis, formulation, and evaluation of Tokyo's public policies.

Third, rapid responsiveness and cross-departmental collaboration. Tokyo's "Voice of Citizens" platform features a rapid response mechanism. Citizen appeals and suggestions submitted through the platform are promptly directed to the appropriate government departments for handling. These departments respond and provide explanations in a timely manner while simultaneously improving administrative services. Similarly, Singapore's OneService platform has established a cross-departmental collaboration mechanism. For example, in solving the problem of urban parking, the platform works closely with large enterprises to create a citywide smart parking network, effectively improving the utilization efficiency of parking resources. This collaborative mechanism breaks down institutional barriers, optimizing resource allocation and enabling real-time information sharing.

In conclusion, the city hotline platforms in Singapore, London, and Tokyo have made meaningful advancements in multi-channel exploration, public participation and feedback, rapid responsiveness, and cross-departmental collaboration. These characteristics reflect the diverse approaches and swift responsiveness of inclusive hotlines, ensuring that these platforms can effectively and conveniently serve a wide range of citizens, address their diverse needs, and provide timely and effective solutions to their problems, thereby enhancing government service efficiency.

(2) Analysis of Hotline Development Based on Spatial Distribution

Cluster analysis helps identify the characteristics and strengths of different city hotlines, uncovering unique service models and development paths for each type. In practice, the results of cluster analysis show certain correlations with regional similarities, influenced by factors such as geographical and cultural context. Spatial analysis enables the identification of development trends and patterns within specific regions, offering a more comprehensive perspective for optimizing and innovating city hotline services. Based on the regions to which the evaluated cities belong, cities can be categorized into four major spatial regions: North America, South America, Europe, and Asia. By analyzing the performance of hotlines in cities with available data, as well as the development status of city hotlines not formally assessed, we can further explore the operational conditions of city hotlines in each region.

1. Cities in North America

Non-emergency hotline services in North American cities began relatively early and have evolved through stages such as number consolidation, digital transformation, and the application of big data technologies, achieving a high level of refinement in hotline process management and data management.

By offering diverse service channels, including telephone, web, and mobile applications, North American cities ensure that citizens from various backgrounds and with different needs can easily access government services. For example, North American 311 hotlines assign unique identification numbers to each appeal, enhancing the tracking and management of work orders while improving the transparency of handling processes. Citizens can use this identifier to check the status of their appeals in real time, a feature that boosts satisfaction and trust through instant feedback mechanisms. San Francisco's 311 hotline employs a customer relationship management system to distribute workloads effectively, improve response efficiency, and reduce redundancy and resource waste. Additionally, its

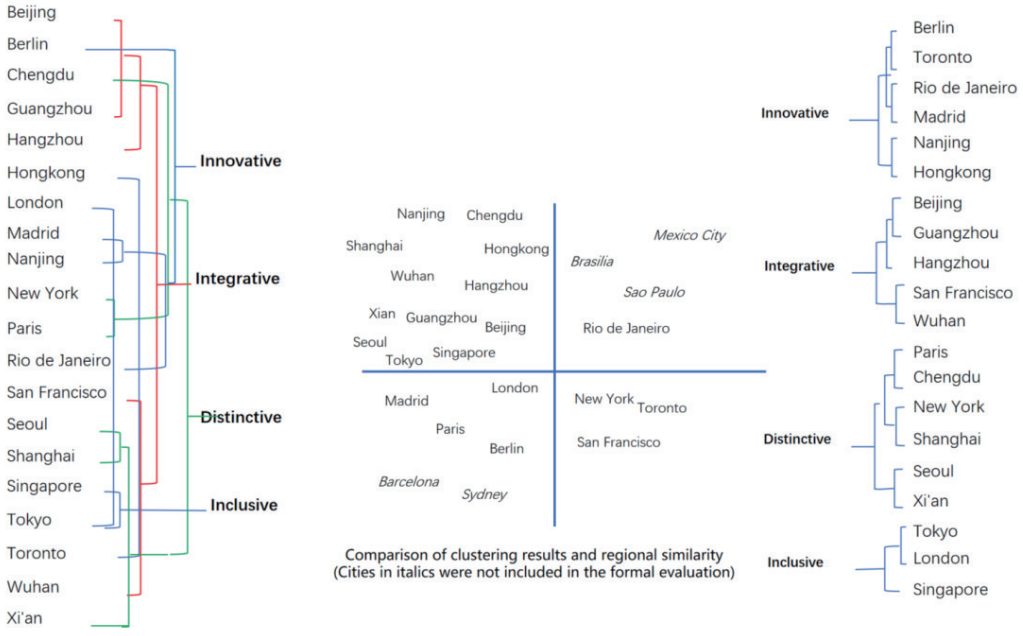


Figure 3-2: Comparison of Cluster Results and Regional Similarities

work order dispatch manual ensures consultation and appeals are quickly and accurately forwarded to the relevant departments, significantly reducing response and resolution times.

North American cities have established unified hotline data management systems to enhance data usability and security, creating valuable data resources for government operations. A notable example is New York's 311 hotline, which emphasizes data openness and efficient application. By implementing a comprehensive data management system, the city allows the public to access and utilize data, fostering constructive citizen participation in urban governance through suggestions and solutions. Similarly, Toronto's 311 system leverages citizen-generated data to drive urban intelligence and sustainable development. This data supports the analysis of citizen needs, trend forecasting, and policy formulation, enhancing the scientific precision of decision-making.

2. Cities in South America

City hotlines in South America are in a continuous phase of development and optimization. Based on these platforms to establish efficient and accessible communication channels with the public, cities have capitalized on improvements in communication technologies to innovate their non-emergency hotlines. Over time, South American cities have refined their process management and enhanced the collaborative capacity of their hotlines.

Efforts have been made in multi-channel development to ensure citizens' consultation and appeals are promptly attended to. For instance, São Paulo's 156 hotline has extended its communication channels by launching services on WhatsApp, where chatbots and mobile applications expand the interface for citizen-government interactions. The adoption of digital

technologies has also simplified access to services such as public transportation and road maintenance offered by the 156 hotline.

Strategic planning and standardized regulations provide a clear developmental direction and objectives for hotline services in South American cities, unifying service processes and quality standards. Brazil's Ouvidorias website platform exemplifies the integration of systems, data analysis, and social needs. The platform aims to enhance the quality of public policies and services by providing comprehensive strategic plans and service guides. It also improves government transparency by helping users understand the categories of public services available and how to access them.

Rio de Janeiro's 1746 hotline adheres to principles of whole-process transparency management, ensuring that citizens can clearly track and understand service workflows in real time. By setting explicit service timelines and quality standards and conducting data tracking and analysis, government departments can monitor their performance metrics and make continuous improvements based on citizens' feedback. To ensure the sustained improvement of service quality, Rio's 1746 hotline employs big data to monitor and evaluate the performance of all service stages, driving ongoing improvements in service processes.

3. Cities in Europe

The development of European city hotlines originally aimed to establish effective communication channels between citizens and governments, ensuring that citizens can directly report problems and express needs. Over time, European hotlines have expanded their service scope to achieve comprehensive coverage, forming a broad service network that includes urban communities and all levels of government, from municipal to federal. These hotlines have extended their offerings from initial emergency services to areas such as social services, municipal management, and public facility repairs, effectively addressing diverse citizen needs. Among their strengths, European city hotlines excel in responsive governance.

Berlin's 115 hotline is committed to achieving wide service coverage, integrating services across communities, states, and federal levels. With a service level target of "80/20," which means 80% of calls are answered within 20 seconds, it emphasizes human-to-human communication and personalized service. Similarly, Paris' 3975 hotline improves responsiveness by setting a performance standard for answering calls within 30 seconds. These efforts enhance the effectiveness and responsiveness of hotline services across European cities.

Customer service representatives for European city hotlines typically undergo rigorous training and evaluation to ensure their professionalism in handling diverse consultation and appeals. Madrid's 010 hotline has established strict service standards requiring call operators to complete at least 100 hours of initial training and a minimum of 20 hours of advanced training annually, alongside quarterly assessments to evaluate service performance. Paris' 3975 hotline employs a professional team of phone advisors trained to manage complex citizen requests and provide expert guidance and assistance.

By collecting citizens' feedback and analyzing service data, European city hotlines continually adjust and optimize their service processes. This culture of continuous improvement not only enhances service efficiency and effectiveness but also fosters positive citizen perceptions of government services.

4. Cities in Asia

The development of Asian city hotlines reflects a transition from basic services to intelligent and integrated services, alongside a continuous pursuit of improving government responsiveness and service efficiency. To enhance efficiency, many Asian cities have consolidated multiple hotlines into unified communication channels, such as the "12345 Citizen Service Hotline," adopting a "single-number service" model. Asian hotlines particularly excel in smart governance and responsive governance.

As call volumes increase, many Asian hotlines have introduced diverse access channels, including telephone, internet, and new media, allowing different groups to voice their appeals through various platforms. Through technological upgrades and staff training, these hotlines maintain high call connection rates. Hong Kong's 1823 hotline introduced chatbot functionality to reduce citizen wait times and improve service efficiency. Guangzhou's 12345 hotline uses an intelligent voice navigation assistant to shorten the average wait time for connecting to human operators. Nanjing's 12345 hotline has expanded its intelligent application scenarios, upgrading features such as intelligent dispatch, follow-up, and assistance to respond to citizen appeals more rapidly. Beijing's 12345 hotline established a "Swift Response to Public Complaints" mechanism to achieve fast appeal transfer and processing, improving the accuracy and efficiency of inquiry handling and enhancing performance in areas like response rate of complaints and the solution of problems.

By analyzing hotline data, Asian hotlines support government decision-making, optimize resource allocation, and improve policy precision and effectiveness. Singapore's OneService platform leverages AI and big data to analyze the distribution of citizens' needs and problems, enabling departments to allocate resources more efficiently. Beijing's 12345 hotline utilizes big data mining to identify prominent livelihood issues and governance bottlenecks from a vast repository of citizen complaints, conducting targeted governance initiatives. It produces daily, monthly, quarterly, and annual reports, as well as specialized analysis, to identify patterns and trends in public needs. These innovative measures have significantly improved hotline service quality and efficiency, contributing positively to addressing common urban issues and diagnosing underlying governance challenges.

(3) Analysis of Hotline Development Based on Urban Scale

"Urban scale" typically refers to a city's overall performance in terms of population and economic factors. Specifically, a city's population size and gross domestic product (GDP) are key indicators for measuring urban scale. By analyzing the correlation between population size, GDP, and the overall performance of hotlines, it becomes evident that population size is positively correlated with hotline performance, while GDP shows no such correlation. In other words, as population size increases, hotline performance improves.

From the perspective of Process Governance, as urban populations grow, the demand for hotline services increases significantly. Cities with larger populations face greater service demands, prompting hotlines to optimize staffing and technical support to maintain high call connection rates and meet citizens' needs. Population-dense cities are more likely to develop multiple channels—such as telephone, apps, mini-programs, and online platforms—for receiving and addressing citizen appeals. This diversification eases pressure on single channels, enhancing service efficiency and coverage. To effectively manage and track the large volume of citizen appeals in populous cities, hotlines often implement unique identification number systems for appeals, enabling callers to track their status in future interactions. Such systems improve the transparency and efficiency of appeal processing, ensuring timely and effective responses. Additionally, large-population cities handle more work orders, necessitating comprehensive work order dispatch systems to ensure appeals are rapidly and accurately routed to relevant departments. These mechanisms enhance efficiency, reduce delays, and increase citizen satisfaction.

From the perspective of Collaborative Governance, cities with larger populations require comprehensive and forward-looking strategic planning to address complex needs for social governance. Hotline services, as a critical component of urban governance, must align strategic development plans with population scale and service demands to ensure effective and proactive service delivery. Larger populations increase the volume and complexity of hotline service needs, requiring adherence to higher standards and stricter protocols to maintain quality and efficiency. In populous cities, hotline services often operate under high-level collaborative supervision, facilitating interdepartmental and multi-tier coordination and decision-making to ensure rapid responses and effective handling of citizen appeals. Merging multiple city hotlines is common in such cities to streamline communication channels and improve efficiency. This consolidation centralizes resources and information, offering better services to citizens. Furthermore, hotline services in populous cities often integrate closely with emergency hotlines, ensuring that citizens can receive prompt assistance during crises.

From the perspective of Smart Governance, cities with larger populations face more challenges and complex projects in urban governance, necessitating detailed scenario-based project lists to address diverse needs of citizens. Hotline data mining identifies deep-rooted governance issues, high-frequency common problems, and pain points, enabling precise diagnosis and resolution. Such lists facilitate targeted governance optimization plans and goals. The extensive data generated by hotlines in populous cities provides a rich resource for scenario-based governance or service case studies. Analyzing this data reveals trends and patterns in citizen needs, offering robust decision-making support for management authorities. For instance, analyzing the categories and volumes of citizen appeals can highlight deficiencies in policies or services, prompting timely improvements. High data volumes from populous city hotlines necessitate daily, monthly, quarterly, and annual reports to support government decision-making and management. Beijing's 12345 hotline, for example, employs a "daily report, weekly analysis, monthly summary, annual review" mechanism to track trends and patterns in citizen appeals, enabling proactive problem-solving.

From the perspective of Responsive Governance, high populations increase the demand for

hotline services, requiring improvements in response efficiency and shorter waiting time to meet citizens' expectations. Hotline staff in densely populated cities must handle a higher volume of consultation and appeals, enhancing their expertise to cope with frequent calls. The high usage frequency of hotline services in populous cities also fosters greater citizen trust, built on the ability of the hotline to respond promptly and resolve issues effectively. High-population cities often provide 24/7 services, age-friendly options, and adaptive services, further increasing citizen satisfaction. These features ensure broad service coverage and inclusivity, meeting the needs of diverse citizen groups.

The evaluation results indicate that economic prosperity does not necessarily correlate with superior hotline performance. Cities with slower economic development can still achieve high hotline performance through effective management and services. Conversely, economically advanced cities may prioritize other areas, such as infrastructure or economic development, over hotline services, potentially leading to stagnation in hotline performance. Hotline outcomes depend more on management systems and workflow efficiency than on GDP. From the perspective of citizens, demands and feedback may not correlate with economic output. Citizens are more concerned with the quality and efficiency of services than with economic growth.

Overall, population size has a more significant impact on hotline governance performance, directly influencing citizens' demands and feedback, whereas GDP has a weaker effect due to various constraints. To improve hotline governance, governments should focus on demographic changes, enhancing citizen participation, and prioritizing public service construction alongside economic development.

II. Category Analysis

(1) Evaluation of Process Governance

As a first-level indicator in the Hotline 4G Evaluation System reflecting whole-process governance, the Process Governance indicator spans the entirety of city hotline services. Its primary goal is to capture the close connection between citizen appeals and their resolution, providing a quantitative standard for assessing the quality of the appeal handling process and outcomes.

From the scoring results of the first-level indicator Process Governance, the average score of participating cities is 16.4 points (out of 20). Cities such as Beijing, Hong Kong, Guangzhou, New York, Toronto, and Xi'an serve as examples where city hotline services have established relatively comprehensive channels for handling appeals. These cities have achieved efficient, precise, and holistic development in the processes of appeal acceptance, referral, and business handling. The Beijing 12345 hotline has restructured its workflow, forming a closed-loop system of "acceptance-processing-feedback," which ensures coordination and consistency across all process stages.

To systematically evaluate the actual level of Process Governance, this first-level indicator is divided into two second-level indicators: appeal acceptance and appeal transfer, focusing on the two

critical aspects of Process Governance. The appeal acceptance indicator evaluates whether citizens can conveniently access assistance through city hotlines, emphasizing the accessibility of hotline services, often measured through call answer rates. Additionally, this indicator examines the diversity of help-seeking channels. For instance, New York's 311 hotline has continuously expanded its service channels to include telephone, websites, social media, mobile applications, SMS, video, and voice options, enhancing both service efficiency and user experience. Some cities excel in specific second-level indicators. For example, Beijing's 12345 hotline boasts a call answer rate as high as 98.0%, while Nanjing's 12345 hotline offers a diverse range of acceptance channels, achieving integrated and multi-faceted service development.

In the appeal transfer dimension, most cities have established well-developed appeal management systems, reflecting high levels of standardization and governance effectiveness. Over 80% of cities use unique tracking numbers for appeals, ensuring that each appeal can be traced throughout its lifecycle—from acceptance to resolution. This enables citizens to continuously monitor the progress of their appeals using the tracking number. Similarly, over 80% of cities have developed systematic work order dispatch knowledge bases or manuals, showcasing a mature level of scientific and standardized handling and dispatch processes. For instance, Beijing's 12345 hotline leverages the government's responsibility list to create a "dispatch directory," categorizing various issues into detailed classifications to ensure precise categorization and dispatching. Call operators can quickly select direct dispatch options in the system, sending inquiries to the appropriate citizen appeal handling center. For appeals with clearly defined responsible departments and well-identified locations, direct dispatching ensures efficient resolution.Overall, the standardization of appeal transfer processes has become a critical benchmark for assessing the governance effectiveness of hotlines.

(2) Evaluation of Collaborative Governance

The Collaborative Governance indicator evaluates the frequency and quality of cooperation among diverse governance entities within the government. It encompasses the coherence of different policies, the level of collaboration among functional departments, and the degree of coordinated interaction between functional departments and local governments.

The average score for the Collaborative Governance indicator is 18.1 (out of 25), with 12 cities scoring above the average. Megacities such as Beijing, Wuhan, and Seoul excel in this area, achieving full marks across the three second-level indicators: policy collaboration, function coordination, and platform collaboration.

The policy collaboration indicator assesses the integration of strategic planning and consistency of standards and norms, emphasizing the uniformity and coherence of multi-level policy formulation and implementation. For instance, Beijing's 12345 hotline adheres to principles of high-level planning, high-standard construction, and high-efficiency operations, ensuring a clear strategic role at the macro-policy level and fully leveraging its function as a vital communication bridge between the government and the public. Similarly, Xi'an's 12345 hotline focuses on improving administrative efficiency and public service quality as its strategic goal. It has systematically integrated various

government and social service hotlines through a phased approach and established four-level classification standards for handling citizen appeals, enhancing data consistency.

In terms of function coordination, hotline services require coordinated efforts across departments to form a collective force in solving problems. This indicator focuses on the hierarchy of coordinated supervision leadership and the mechanisms of inter-departmental collaboration. The average score for the function coordination indicator among participating cities is 7.6, with Beijing, Wuhan, Seoul, Shanghai, Hangzhou, Chengdu, and San Francisco achieving full marks of 10. For example, San Francisco's 311 hotline has established a well-defined cooperation model with departments responsible for public services, transportation, and safety, promoting inter-departmental communication and coordination. For cross-departmental service requests, the 311 hotline utilizes its Hotline Customer Relationship Management System (LAGAN) to ensure data connectivity among multiple departments, reducing communication costs and improving problem-solving efficiency.

The platform collaboration indicator requires city hotlines to coordinate with other governance platforms, achieving resource sharing and information integration to enhance governance efficiency. Most participating cities performance well in hotline integration and coordination with emergency hotline. Cities with outstanding performance, such as Beijing's 12345 Hotline, have integrated 64 original governmental hotlines into a unified service platform, complemented by "20+N" online channels, enabling all-time, comprehensive handling of public appeals. Similarly, Seoul's 120 City Hotline has signed a cooperation agreement with the Institute for Healthy Family and its Danuri Call Center to provide consultation services for immigrant women and multi-cutural families, addressing their problems in communication and living in the Republic of Korea and mitigating inconveniences caused by language barriers.

(3) Evaluation of Smart Governance

The Smart Governance indicator measures the depth of integration between technology and governance in government hotlines. It includes three second-level indicators: (1) the level of management and openness of hotline data governance, (2) the complexity, diversity, and efficiency of hotline scenario applications, and (3) the frequency and quality of hotline-assisted government decision-making.

Overall, cities operating 12345 hotlines generally perform well in Smart Governance evaluations. Chinese cities such as Beijing, Guangzhou, and Wuhan are particularly notable for their advanced exploration of governance models empowered by data technologies, focusing on strategies for integrating data with governance. For example, Beijing's 12345 Hotline achieved a score of 28 out of 30 on the Smart Governance indicator, with perfect scores in both secondary indicators: scenario application and decision-making support.

In terms of hotline data management, most cities have established unified and comprehensive data governance systems. For instance, Seoul's 120 City Hotline has developed a multi-dimensional data collection and analysis framework, while Hong Kong's 1823 hotline leverages the Siebel Customer Relationship Management System to achieve full-process data management.

Regarding hotline data openness, six cities, including Guangzhou, San Francisco, and Madrid, scored full marks (10 points) on this indicator, reflecting their implementation of multi-level, multi-dimensional data openness policies. These policies enable data interoperability among government departments and openness to third-party institutions and the public. For example, San Francisco's 311 hotline shares critical data—such as appeal types, content, time, and location—through its open data platform. This fosters interdepartmental information exchange and drives governance innovation in areas such as environmental protection, public facility management, and cultural preservation. Data openness also enhances government transparency and strengthens public trust, allowing citizens to access real-time updates on the outcomes of public service appeals. However, some cities still exhibit deficiencies in data openness, indicating room for improvement in the depth and breadth of data value exploration.

In the scenario application indicator, some cities have excelled by leveraging hotline data to precisely address high-frequency challenges and deep-seated issues in urban governance across various scenarios. These cities actively explore optimized governance solutions tailored to specific scenarios. For example, Beijing's 12345 hotline uses scenario-based analysis to identify patterns and trends in citizen appeals, analyze the spatiotemporal distribution of governance pain points, and diagnose the root causes of governance challenges. This approach enables the proactive identification and resolution of issues. Similarly, Guangzhou's 12345 hotline focuses on frequently asked questions in government affairs, constructing a structured, intelligent, and scenario-based knowledge base covering critical areas such as social security, medical insurance, housing funds, and business services. With over 200 governance scenarios, it provides precise answers to citizen consultation.

Of particular note is the function of decision-making support, where cities such as Beijing, Wuhan, Hangzhou, Chengdu, Shanghai, and Nanjing have excelled. These cities not only establish routine data analysis mechanisms but also emphasize converting analytical results into actionable governance solutions. For instance, Beijing's 12345 hotline employs a "Theme of the Month" governance mechanism to effectively address urban governance challenges. This practice of leveraging data to enable scientific decision-making is providing new momentum for the modernization of urban governance.

(4) Evaluation of Responsive Governance

The Responsive Governance indicator emphasizes public participation and service evaluation, reflecting the higher expectations of modern governance for governments to deliver rapid, targeted, and high-quality responses. This first-level indicator includes two second-level indicators, which measure the inclusiveness of city hotline services and overall service evaluation. Cities such as Beijing, Hangzhou, Guangzhou, and Madrid have achieved notable success in Responsive Governance.

From the perspective of specific indicators, hotline services directly address citizens' needs and should strive to achieve maximum coverage of those needs. Cities such as Beijing, Guangzhou, and Madrid performed exceptionally well in the service coverage indicator, achieving full marks. For instance, Beijing's 12345 hotline reported a per capita call volume of 1.1 calls, , indicating that in this mega-city with a population of nearly 20 million, each resident, on average, has called the 12345

Hotline at least once for assistance.

In terms of adaptive services, hotline services must account for the diverse needs of different groups, including seniors, foreigners, individuals with disabilities, and those with emergency appeals. These services should establish a tailored, inclusive, and diverse system to ensure that all groups receive the same high level of service. Beijing's 12345 Hotline offers comprehensive and adaptive services, establishing a targeted, inclusive, and diverse service system. Seoul's 120 Hotline exemplifies this approach by addressing the special needs of individuals with hearing and language impairments, offering SMS and multi-media information services that allow users to send texts or images of up to 1,000 characters for consultation and appeals. Additionally, the hotline has integrated foreign-language consultation services, covering Korean, English, Chinese, Japanese, Vietnamese, and Mongolian.

The overall evaluation indicator further divides into five dimensions to assess response speed, response quality, and public perceptions of the hotline. Hotline services must ensure that citizen appeals receive timely feedback while demonstrating high levels of professionalism in handling specific issues. Problem-solving should be rapid, proficient, and scientific, ensuring that citizens' demands are effectively resolved. Hangzhou's 12345 hotline stands out in this regard. It has strengthened its knowledge base by expanding and refining its directory, increasing the range of issues that can be resolved immediately, and implementing "proactive handling before complaints are made." Additionally, through intelligent analysis and "tracking governance," Hangzhou integrates multi-channel data and uses AI models to analyze high-frequency appeals and risks, enabling early warning and preemptive conflict resolution. Consequently, Hangzhou ranks among the top in professionalism, effectiveness and proficiency.

As to the hotline trust and satisfaction, participating cities have earned a certain level of citizen recognition. For example, New York's 311 hotline leverages transparent and open data to allow the public and social organizations to gain direct insights into urban governance issues. Through the platform, citizens can submit opinions and suggestions and actively participate in urban governance and decision-making processes. This participatory process enhances citizen-government interaction, fostering citizens' sense of belonging and responsibility while bolstering government credibility.

In the context of governance model transformation, public evaluation increasingly plays a pivotal role, becoming a critical metric for assessing government performance and hotline service quality. As a representative example, Beijing, through the 12345 Hotline, not only ensures citizens' rights to know, participate, express, and supervise, but also actively builds a responsive governance system, continually improving the efficiency and quality of addressing citizens' needs and expectations. Guided by a "people-centered" governance philosophy, governments prioritize public satisfaction as the foundation and goal for service improvement. Continuously improving governance levels to meet citizens' expectations and needs represents the pathway and direction for practicing this philosophy, aligning governance outcomes with the demands of the people.

III. Characteristic Identification [7]

Among the various channels for citizens to express their demands, city hotlines interact with other feedback channels in diverse ways and integrate into urban services and governance processes. This leads to significant differences in the service and governance effectiveness of hotlines across cities worldwide. The following analysis examines the development characteristics of city hotlines from three perspectives: functional positioning, management structure, and development stage.

(1) Functional Positioning: "Hotline-Driven" vs. "Hotline-Supportive"

From the perspective of functional positioning, urban services and governance can be categorized into two types: “Hotline-Driven” and “Hotline-Supportive” models.

1. Hotline-Driven

In hotline-driven cities, city hotlines serve as the primary channel for citizen-government interaction. Citizens’ demands, opinions, and feedback are swiftly transmitted to government departments through hotlines, prompting quick government responses. This functional positioning establishes hotlines as critical "bridges" between citizens and governments. Through feedback mechanisms, citizens’ demands directly influence governmental decision-making and policy formulation.

Hotline-driven cities emphasize improving the entire service chain of city hotlines, balancing efforts in facilitating public expression, enhancing hotline data management, leveraging data for decision-making, and improving feedback and service levels. Examples include the 12345 hotlines (in Beijing, Guangzhou, Wuhan, Hangzhou, etc.), 311 hotlines (in New York, San Francisco, and Toronto), and the 1746 hotline (in Rio de Janeiro).

These hotlines are not merely platforms for consultation and appeals but also vital tools for governments to understand public opinion and improve policies. For example, Beijing’s 12345 hotline integrates resources across multiple departments, establishing information-sharing and rapid-response mechanism. It serves as a central system that consolidates citizens’ demands and government’s services, producing comprehensive analytical reports and actively participating in urban decision-making and governance improvement. Similarly, New York, San Francisco, and Toronto’s 311 hotlines optimize administrative process and public service quality through integrated hotline platforms, standardized data management models, and data openness to foster greater citizen participation. Rio de Janeiro’s 1746 hotline collects data from state and municipal departments, profit and nonprofit organizations, and the public, achieving transparency in government management and enabling a dynamic urban management mechanism through comprehensive data analysis.

2. Hotline-Supportive

In hotline-supportive cities, city hotlines primarily function as auxiliary tools to improve the service quality of functional departments. These hotlines are not the main channels for citizen-government interaction but serve as support systems that help governments handle citizens’ demands

more effectively. In these cities, functional departments typically manage public service tasks directly. City hotlines act as intermediaries, recording and redirecting citizen issues to the relevant departments, thus optimizing service quality within the existing administrative framework.

Tokyo and London exemplify hotline-supportive cities. In Tokyo, routine municipal services are managed by local government departments. For urban service issues not covered within the existing administrative framework, citizens typically turn to legislative bodies (e.g., Tokyo Metropolitan Assembly or ward councils) or local community organizations (e.g., neighborhood associations) to address and resolve problems. In London, municipal services are divided among the Greater London Authority (responsible for policing, transportation, firefighting, environmental protection, etc.), borough councils (responsible for local public affairs), and national functional departments (e.g., healthcare). Additionally, certain non-governmental consultation or appeals are handled by third-sector organizations, such as Citizen Advice. Citizens select the appropriate hotlines or online platforms to address their needs based on their specific demands.

Primarily offering guidance, information consultation, and service redirection, city hotlines are not positioned as central governance tools but as supportive mechanisms in such cities. This approach optimizes the allocation of urban service resources. As a result, individual hotlines or service platforms in these cities face less service pressure, leading to simplified service processes, leaner staffing, and more efficient resource allocation.

(2) Management Structure: "Hotline-Integrated" vs. "Hotline-Distributed"

From the perspective of management structure, city hotlines can be categorized into two types: “Hotline-Integrated ” and “Hotline-Distributed ”.

1. Hotline-Integrated

The Hotline-Integrated management structure consolidates comprehensive urban service tasks into a single hotline (or integrated service platform), creating a centralized service hub. This structure’s advantages lie in its ability to centralize information and resource management, providing citizens with convenient one-stop services and reducing information barriers among government departments to enhance service efficiency. In this model, city hotlines function not only as communication channels but also as platforms integrating diverse government service resources. Centralized management facilitates better coordination of task allocation among departments, improving overall service efficiency.

Examples of Hotline-Integrated management structure include China’s 12345 hotlines, Rio de Janeiro’s 1746 hotline, Seoul’s 120 hotline, and Berlin’s 115 hotline. These hotlines are designed to offer citizens comprehensive feedback channels for urban services. They benefit from multi-level institutional support, ranging from long-term strategic development plans and standardized guidelines to detailed operational frameworks. These hotlines are managed by unified departments that oversee organization, personnel, and hotline data, integrating various municipal service scenarios.

The 311 hotline in the United States exemplifies another variant of Hotline-Integrated system, transitioning from a single-department non-emergency hotline to a centralized service hub. Initially established to alleviate the call volume on the emergency 911 hotline, the 311 hotline redirected non-emergency police appeals. Over time, as citizens' demands diversified, its services expanded beyond police matters to encompass broader urban services, managed by specific agencies in each city.

2. Hotline-Distributed

In contrast, the Hotline-Distributed management structure involves functional departments independently establishing and managing single-purpose hotlines, forming a parallel service system. In this model, multiple departments and organizations provide diverse hotline channels, enabling citizens to directly contact the relevant functional department or social organization based on their needs. This structure's advantage is its ability to distribute citizens' demand pressures across departments, allowing specialized focus in each field and facilitating precise policy implementation.

Cities such as Tokyo, London, and Singapore adopt Hotline-Distributed management structures, where individual departments assume responsibility for hotline services. For instance, Tokyo's 9110 police consultation hotline remains under the police department's management without integration into a centralized system, focusing on police-related consultation and assistance. Tokyo also offers a Voice of Citizens comprehensive service window, which compiles and publishes contact numbers for functional departments but does not integrate entry points. Citizens can directly call department-specific numbers, and calls to the comprehensive window are quickly transferred to the appropriate department for resolution.In London, the 101 non-emergency police number, 111 medical hotline, and 61016 transport police non-emergency number are managed by the Metropolitan Police, National Health Service (NHS), and British Transport Police, respectively. Additionally, other social organizations provide help and consultation hotlines. The Greater London Authority and individual boroughs also maintain citizen contact and appeal channels. Singapore offers a diverse array of city hotline services, each independently managed by functional departments, operating alongside the OneService platform.

While the distributed model is relatively weaker in resource integration and lacks a unified feedback mechanism for complex urban governance scenarios, it excels in handling clearly defined tasks. Citizens' demands are more rapidly addressed by specialized personnel, enhancing service precision and professionalism.

(3) Development Stage: "Service Empowerment" vs. "Governance Empowerment"

From the perspective of development stage, city hotlines can be categorized into two developmental models: "Service Empowerment" and "Governance Empowerment".

1. Service Empowerment

The service empowerment model is prevalent in cities that entered the telephone communication era earlier but have not undergone iterative upgrades in hotline services. At this stage, the primary objective of hotlines remains to serve as a channel for citizens to communicate with the government and express daily concerns, to meet basic needs through improving service quality and response

speed. Although the development of internet technologies has enabled such hotlines to offer online services like web-based forms, the focus remains on addressing citizens' needs to express and enhancing their sense of satisfaction through direct service provision.

Examples of service empowerment hotlines include Hong Kong's 1823 hotline and Paris' 3975 hotline. These cities prioritize the enhancement of hotline service systems, improving accessibility, fostering citizen participation, and increasing satisfaction with government services. The primary task of these hotlines is to promptly respond to citizens' demands. Measures such as adding functional modules and improving the professionalism of service personnel are employed to achieve the goal of service empowerment.

2. Governance Empowerment

With the accumulation of hotline data and advancements in networking, digitization, and intelligent technologies, the governance empowerment model leverages the enormous potential of data in modern urban governance. In this model, hotlines are not merely service windows but are transformed into tools that empower governance. These cities emphasize the collection, management, and analysis of massive amounts of hotline data, integrating it as a critical component of urban governance. Beyond simply responding to citizens' needs, governance empowerment hotlines utilize data analysis and intelligent forecasting to support government decision-making, improve interdepartmental coordination, optimize process governance, and drive smart city governance.

In China, cities such as Beijing, Guangzhou, Shanghai, and Hangzhou have transitioned into this governance empowerment stage with their 12345 hotlines. International counterparts include New York (311), Seoul (120), and Rio de Janeiro (1746). These hotlines or platforms not only consolidate citizen appeals but also leverage big data technologies to analyze massive datasets, uncover deep-seated social governance issues, and provide decision-making references for governments. For instance, Guangzhou's 12345 hotline explores the application of artificial intelligence and large language models, introduces intelligent voice navigation and customer service systems, and empowers the digitization of grassroots governance. Shanghai's 12345 hotline utilizes analytical systems to identify hotspot issues and potential social risks, assisting the government in achieving more precise governance.

Singapore's OneService platform exemplifies a novel approach to collecting and handling urban appeals in the era of modern communication. Established in 2015, OneService operates as a mobile app and chatbot-integrated feedback platform, handling approximately 38% of citizen appeals in Singapore. While it deviates from the traditional hotline format, it embodies a development model tailored to the digital intelligence era. By collecting large volumes of citizen appeals, structuring data, and conducting in-depth analysis, OneService optimizes services, identifies urban governance pain points, and precisely improves urban service quality.

In recent years, platforms such as Singapore's OneService and Berlin's 115 hotline have focused on developing and utilizing chatbots. These systems explore data-driven methods to supplement or replace human services in customer-facing operations, representing a forward-looking pathway in hotline and governance innovation.

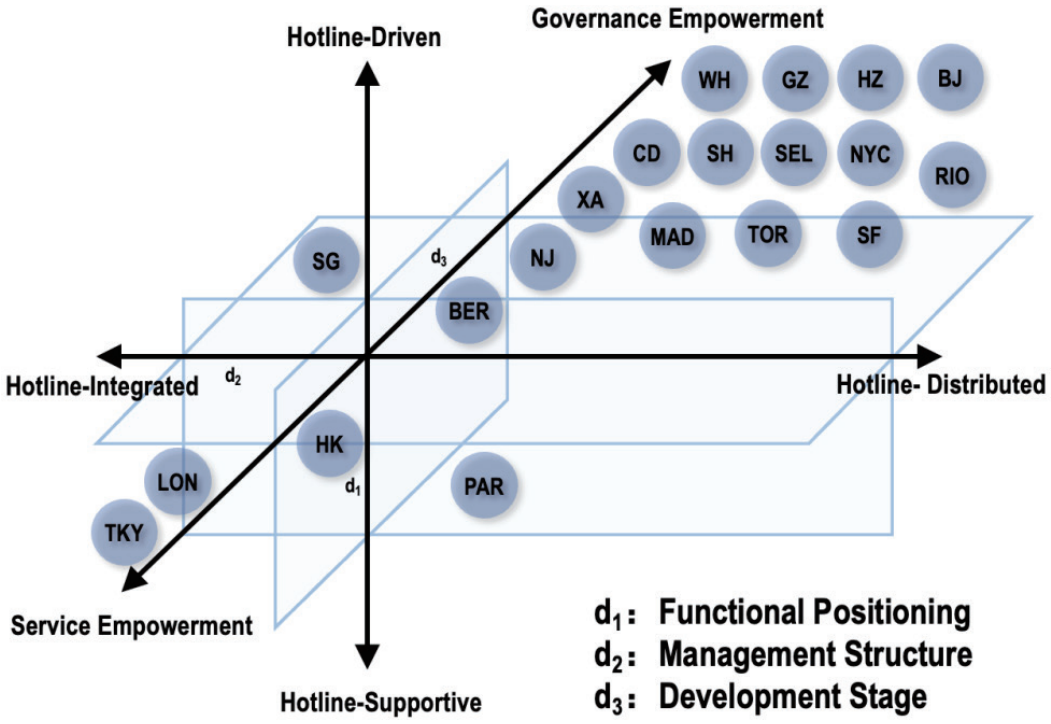


Figure 3-3: Dimension-Based Identification of City Hotline Characteristics

In summary, influenced by various urban management models, hotlines in different cities exhibit significant differences in functional positioning, management structure, and development stage. From the perspective of hotline effectiveness, in the cities with hotline-driven and integrated management models, hotlines play a more critical role in urban governance and municipal services. These hotlines cover diverse service scenarios and cater to a wide range of user groups while managing intricate and complex hotline operations. Conversely, cities with hotline-supportive and distributed management models emphasize the functionality of existing administrative frameworks and the flexibility and professionalism of independent departmental responses. Regarding development stage, cities in the service empowerment phase focus on enhancing citizens' sense of service acquisition, while those in the governance empowerment phase prioritize the integration of hotlines into urban smart governance. This model further improves the precision and responsiveness of urban governance, offering citizens more intelligent and convenient service experiences.

Chapter 4

Comparative Analysis of Worldwide City Hotlines

Process Governance, Collaborative Governance, Smart Governance, and Responsive Governance are four primary indicators for measuring the service and governance effectiveness of city hotlines, reflecting the degree of governance embedding, transformation driving force, system integration, and value realization of hotline governance. Governance embedding reflects the depth of service provision and the breadth of structural reforms; transformation driving force reflects the support and response capabilities of the supply side, functional side, consultative side, and demand side; system integration encompasses the integration and collaboration of hotline organizations with organizational structures, decision-making systems, and service systems; and value realization is the direct embodiment and ultimate goal of hotline handling, governance, decision-making, and service value. These four dimensions provide a comprehensive comparative perspective for understanding and assessing the four primary indicators of city hotlines, helping to deeply analyze and improve the service and governance effectiveness of city hotlines.

Based on Worldwide City Hotline Services and Governance Effectiveness Evaluation System and development stages, a 4×4 matrix framework was constructed for systematic comparative analysis. This framework examines the relationships between four first-level indicators—"appeals and responses," "appeals and governance," "appeals and policies," and "appeals and perceptions"—along the horizontal dimension. Vertically, it evaluates four dimensions: governance embedding, transformation driving force, system integration, and value realization, forming a comparison matrix based on indicator data (see Table 4-1).

The matrix-based comparative analysis framework, designed according to Worldwide City Hotline Services and Governance Effectiveness Evaluation System, not only enables a straightforward and systematic assessment of the development levels across various dimensions of worldwide city hotline but also reveals the intrinsic connections among these dimensions. Moreover, it distinctly identifies the development characteristics and unique features of different city hotlines, providing

Table 4-1 Worldwide Hotline Development Matrix Comparative Analysis Framework

	Appeals and Responses	Appeals and Governance	Appeals and Policies	Appeals and Perceptions
Governance Embedding Depth	Service Provision	Structural Transformation	Digital and Intelligent Support	People-Centric Orientation
Transformation Driving Force	Supply-Side Reform	Function-Oriented Restructuring	Policy Advisory Support	Demand-Side Response
System Integration Degree	Process Optimization and Integration	Organizational Structure Integration	Decision-Making System Integration	Service Response Integration
Value Realization Degree	Realization of Service Value	Realization of Governance Value	Realization of Decision-Making Value	Realization of Service Response Value

directional guidance and targeted recommendations for improving hotline development pathways and governance effectiveness.

I.Comparison of Governance Embedding

(1) Depth of Service Provision Embedding

In terms of the depth of service provision embedding, worldwide city hotline exhibit common developmental characteristics.

One characteristic is the embedding of call service capability. With the ongoing construction and iterative development of city hotlines, the basic service support capacity of these hotlines has gradually improved. The average call connection rate for the 20 international metropolises reaches 90.7%, with Hong Kong's 1823 hotline achieving a remarkable 99.7% call connection rate in 2023, demonstrating strong call service capabilities. High connection rates reduce waiting times and improve hotline responsiveness.

Another characteristic is the embedding of diversified service channels. Worldwide city hotline have generally established a "multi-in-one" service matrix, with an average of over four service channels available, providing citizens with more convenient services. Cities such as Toronto, Guangzhou, Nanjing, New York, and Hong Kong offer up to six or more online channels, allowing citizens to report issues at any time and from anywhere. Notably, New York's 311 hotline receives over 28.0% of its total appeals through online channels, while Hong Kong's 1823 hotline integrates seven service channels, including phone, email, app, government websites, and social media platforms, marking a deep transformation towards digitalization.

The third characteristic is the accuracy of tracking and transferring appeal. In 17 out of the 20 international cities, unique identification codes are assigned to each appeal at the time of hotline acceptance to dynamically track the processing progress and results of the appeal. Furthermore, 16 cities' hotline organizations have appeal workflow guides or knowledge bases to improve the efficiency and accuracy of transferring appeal between different government levels and functional departments, thus reducing delays and errors caused by improper appeal transfers. This refined management optimizes internal government work procedures, enhancing the continuity and coordination of government services.

(2) Embedding of Structural Transformation

The depth and breadth of government governance structure collaboration and transformation are key indicators for assessing the modernization of urban governance. Worldwide city hotline show significant transformational trends in terms of structural transformation embedding.

A notable trend is the integration and coordination of hotlines. Over 70% of the cities evaluated have implemented structural reforms in hotline services, such as integrating municipal government

hotlines and coordinating with emergency hotlines. These helps the government allocate resources efficiently and ensure that urgent citizen requests are prioritized and processed quickly.. Non-emergency appeals are also effectively handled. 80.0% of the city hotlines have merged with other service hotlines, effectively utilizing government resources and improving service efficiency. 75.0% of city hotlines are coordinated with local emergency rescue hotlines, improving police hotline operations and enhancing citizens' sense of safety.

The second trend is the systematic embedding of departmental consultation. In the process of hotline-driven urban governance modernization, coordination and consultation between hotline departments and other government departments ensure timely and effective handling of citizen appeals. In 19 out of the 20 international metropolises, a routine cross-departmental consultation mechanism has been established to institutionalize interdepartmental connectivity, enabling cooperation and forming an integrated system for processing citizen appeals, thus improving service response speed and problem-solving efficiency.

The third trend is the embedding of efficient collaborative leadership. The establishment of collaborative leadership mechanisms drives efficient departmental cooperation. For complex and difficult appeals that involve cross-departmental or cross-hierarchical support, the efficiency and effectiveness of problem resolution are significantly influenced by whether the issue receives attention and support from senior leaders. In cities like San Francisco, Seoul, Beijing, Hangzhou, Chengdu, and Wuhan, difficult requests are directly overseen by local administrative heads, demonstrating high levels of leadership involvement, resulting in better governance outcomes. In some other cities, deputy leaders or heads of functional departments oversee such appeals.

(3) Embedding of Digital and Intelligent Support

Worldwide city hotline are gradually transitioning from traditional service response to digital governance, with the deep mining and application of hotline data providing strong support for government decision-making.

A key trend is the refined embedding of unified data management. In cities with integrated hotlines, nearly all of them have achieved unified management of hotline data, improving data centralization and usability, and providing a solid foundation for data analysis and decision-making support. Some cities, such as Beijing's 12345 and Rio de Janeiro's 1746 hotlines, have established comprehensive hotline data management systems for full-scale systematic management.

Another trend is the limited embedding of hotline data openness. Hotline data, as a valuable resource, increasingly supports government decision-making and social governance innovation. However, the openness of data varies across cities. On average, each city offers two open data scenarios for government departments, third parties, and businesses. Although there is a consensus on data openness, there is still significant room for improvement. Cities like Paris, Guangzhou, San Francisco, Seoul, Hong Kong, and Madrid exhibit a higher level of data openness.

The third trend is the deep embedding of scenario governance lists. Based on the deep mining of hotline data, many city hotlines have developed governance lists for complex urban problems. In 15

cities, hotlines have created city governance problem lists, helping to concentrate resources and focus on solving the most urgent and complex urban issues. For example, Beijing's 12345 hotline uses a "monthly issue" governance list to address recurring and unresolved common problems, improving the precision, systematization, and effectiveness of governance in large cities.

(4) People-Centric Orientation Embedding

Worldwide city hotline are increasingly enhancing their responsiveness to citizens' needs and ensuring that hotline services are not only efficient but also imbued with humanistic care.

A key development is the immediate response and efficient handling of manual services. Worldwide hotline optimize call center staff allocation and improve staff proficiency to ensure that citizens' calls are answered quickly and professionally. Hotline organizations provide 24-hour service mechanisms to respond to citizens' needs at any time, greatly enhancing citizens' trust in hotline services.

Another development is the humanistic care for the elderly. As societal aging increases, the design of age-friendly services in city hotlines becomes particularly important. Such services reflect care for the elderly and represent a refinement of urban service management. Of the 20 international cities, only 9 hotlines have dedicated age-friendly services, showing significant variation between cities, with room for improvement. Cities such as Shanghai and Guangzhou have introduced "elderly versions" of their services, including dedicated information sections and voice broadcast features, demonstrating their deep care for the elderly population.

The third development is the widespread and inclusive accessibility services. Accessibility services are aimed at providing equal and convenient service experiences for vulnerable groups such as the disabled. In 60% of the cities, adaptive accessibility services are provided, including sign language interpretation, navigation assistance, Braille usage, voice recognition, and captioning to ensure that all citizens can access government services without barriers. City hotlines can only promote true social inclusivity by better serving groups with special needs.

II.Comparison of Transformation Drivers [7]

(1) Governance Driven by Supply-Side Reform

The effectiveness driven by supply-side reform is an important benchmark for evaluating the development process and outcomes of worldwide city hotline from the perspective of hotline agencies, especially in hotline process governance.

The first aspect is hotline coverage and service upgrade. The transparency and accountability of government service, as well as citizen satisfaction are enhanced through comprehensive coverage of hotline services, including technological iteration, services for special groups, and the integration of Function Exchange between Routine and Emergency Conditions. Notably, in Beijing, the "Swift Response to Public Complaints" reform has created a closed-loop system that ensures feedback and

implementation for every complaint, ensuring that every issue receives a response, resolution, and feedback.

The second aspect is channel optimization and supply transformation. Worldwide city hotline continuously optimize service channels to achieve the transformation and upgrading of service supply. Optimized channels provide more touchpoints and more convenient service options, while supply transformation improves service quality through these channels. For example, Seoul's 120 hotline introduced an intelligent customer service system to improve the automation of services. Singapore's OneService encourages residents' participation through a community management platform. These optimizations enhance user experience by making services more convenient and user-friendly, while supply transformation further enhances the quality and efficiency of services.

The third aspect is process reengineering to improve governance quality. Through reengineering their processes, worldwide hotline have effectively integrated resources and optimized service workflows, significantly improving public service response times and urban governance precision. For instance, Beijing's 12345 hotline implemented a full-channel, full-time response mechanism, ensuring timely responses and handling of appeals. After multiple rounds of consultation with local and functional departments, the city innovatively introduced measures such as "first contact responsibility" and "whistle-blowing system" to ensure the effective resolution of complex issues, thereby improving urban governance driven by hotlines.

(2) Governance Driven by Functional Reconfiguration

Functional reconfiguration-driven effectiveness is a key indicator for evaluating the success of Collaborative Governance development through worldwide city hotline, focusing on the reconfiguration and optimization of multiple functional aspects, such as institutional norms, inter-departmental collaboration, and hotline coordination.

The first aspect is the unification of institutional norms. Most cities have developed standard guidelines for hotline management and sustainable development, but only 45% of cities have strategic planning documents for hotline development. Clear strategic plans are directional guides for the development goals and paths of hotlines. For example, Berlin's 115 hotline has developed a "Strategy Paper for the Further Development of 115," while Beijing's 12345 hotline has formulated a "Plan for the Smart Development of Beijing 12345 Citizen Hotline (2024-2026)," providing a clear blueprint and action plan for the hotline's development.

The second aspect is the efficiency of inter-departmental collaboration. Insufficient inter-departmental coordination can result in bottlenecks in the appeal resolution process, leading to delays in addressing cross-departmental issues, reducing service efficiency and negatively affecting citizen satisfaction. Ninety percent of the cities surveyed have established regular inter-departmental coordination mechanisms, which promote resource sharing and collaboration in the normal course of operations. This reconfiguration ensures coherence from policy formulation to implementation and enables quick responses and effective solutions to complex urban issues, providing a solid foundation for building a collaborative and efficient urban governance system.

The third aspect is the integrative reconfiguration of hotline consolidation. Hotline integration reform has profoundly reshaped government service structures and operational processes, merging decentralized hotline services into a unified platform, thus transforming from a multi-channel approach to one-stop service delivery. Hotline integration simplifies citizen-government interactions and promotes internal information flow and resource sharing. The collaboration with emergency rescue hotlines further enhances the government's capacity for rapid response to emergencies, improving the agility and adaptability of urban governance. From the perspective of supply-side reform, this integrative reconfiguration modernizes government governance models and enhances the systematization and synergy of government services.

(3) Governance Driven by Policy Support

Policy support-driven effectiveness is an important indicator of the policy assistance and decision-making support capability demonstrated by worldwide city hotline in the context of smart governance. This is largely due to the deep exploration and efficient application of multiple aspects of policy support, such as scenario services, reporting systems, and policy adoption.

The first aspect is the diversification of scenario services. City hotline data is widely used to optimize urban governance plans. Among the 20 global cities evaluated, hotline data was used to optimize governance in an average of 9.7 scenarios, out of a total of 14 potential scenarios. Based on an understanding of public sentiment and social issues, hotlines should play a deeper governance role by driving solutions to multi-scenario, complex urban problems. In this sense, global cities should continue to expand the scope and depth of hotline data applications.

The second aspect is the systematization of reporting systems. The reporting system plays a core role not only in providing data support for government decision-making but also in problem identification, performance evaluation, resource optimization, risk warning, government-citizen interaction, and service improvement. The global cities surveyed averaged a score of 2.8 in reporting systems, whereas cities with the 12345 hotline scored over 4 points, indicating that these cities' hotlines are more mature in data collection, analysis, and application, with a greater emphasis on real-time, accuracy, and practicality. This strong reporting function provides significant policy support for urban governance.

The third aspect is the effectiveness of policy adoption. The level of policy adoption impacts the responsiveness of policies, the optimization of resource allocation, and the improvement of governance efficiency. A higher level of policy adoption means that hotline data and analysis results are more likely to be adopted by government decision-makers, promoting data-driven governance models, enhancing government-citizen interactions, improving public service satisfaction, and facilitating rapid problem resolution. Global cities have an average policy adoption score of 3.2, with cities featuring the 12345 hotline leading with a perfect score of 4. This high level of leadership involvement ensures that citizen appeals are quickly addressed and transformed into actionable policies, thereby improving the effectiveness of urban governance and service quality.

(4) Governance Driven by Demand-Side Response

In the dimension of transformation drivers, demand-side responses reflect the adaptability and flexibility of worldwide city hotline in responsive governance from the perspective of the public.

The first aspect is the effectiveness of appeal resolution. The effectiveness of resolving complaints is a key measure of the success of appeal handling. Effective resolution reduces citizen dissatisfaction and helps to identify and resolve potential social conflicts. A survey of the public in the evaluated global cities revealed that the effectiveness of appeal resolution was 75.3%, indicating room for improvement in the responsiveness of hotlines and solving real-world problems. Among international cities, London received the highest rating for appeal resolution effectiveness, while in China, Hangzhou citizens rated the resolution effectiveness highest.

The second aspect is citizens' trust in the hotline. High trust in hotline services enhances citizen engagement, a sense of belonging, and fosters positive interactions between citizens and the government, ultimately improving public trust. According to the survey, the average trust level in worldwide city hotline is close to 80.0%, leaving significant room for improvement. In international cities, Rio de Janeiro's hotline had a relatively high trust level, attributed to its excellence in transparency, response speed, and issue resolution. In China, Hangzhou also ranked highly, possibly due to its innovative hotline services, process optimization, and efforts to address citizen concerns.

The third aspect is citizen satisfaction with the hotline. By ensuring that appeal are handled effectively and professionally, hotlines improve both the efficiency of problem-solving and citizen trust and satisfaction. The survey revealed that Hangzhou had the highest satisfaction rate at 93.2%. With continued optimization of service processes and greater efficiency in appeal resolution, this score is expected to increase. High satisfaction not only strengthens citizens' trust in government work but also fosters positive interaction between the government and citizens, thus enhancing public trust. To achieve a higher level of urban governance, cities should focus on the continuous improvement on their hotline service quality, refining service processes and meeting citizens' expectations by gathering and analyzing citizen feedback.

III. Comparison of System Integration

(1) Integration Level of Process Optimization

The level of integration in hotline process optimization is a key indicator for measuring the effectiveness of supply-side efforts in worldwide city hotline. The improvement in this level is mainly reflected in aspects such as efficient coordination of hotline processes, resource optimization, and the deep integration of information technology, all of which together drive a dual leap in the quality and efficiency of hotline services.

Firstly, efficient coordination and integration of hotline processes. Global hotline systems have established efficient demand processing mechanisms, ensuring seamless connections between

various stages such as call answering, demand recording, task assignment, and follow-up feedback. A relatively complete task assignment database enables quick classification and precise task delegation of citizen appeals. During the transfer process, the Beijing 12345 hotline's "mechanism of the primary responsible agency", along with the "Quick Response to Community Calls", strengthens coordination between grassroots and higher-level departments, ensuring that complex issues are resolved collaboratively across departments and levels.

Secondly, the integration of resource optimization and improvement. Optimizing resource allocation is crucial for improving the quality and efficiency of hotline services. The "Theme of the Month" and "Governance-oriented Sub-districts and Townships" practices of Beijing 12345 hotline vividly demonstrate the integration of resource optimization. Through "Monthly Issues," the hotline focuses on high-frequency and difficult problems raised by citizens, concentrating resources for special governance efforts to ensure quick and effective solutions. The "Governance-oriented Sub-districts and Townships" initiative further optimizes resource allocation by identifying and strengthening areas where hotline services underperform, providing dedicated funds and resources, and achieving efficient resource flow and use, thus facilitating the systematic resolution of complex demands in governance spaces.

Thirdly, the integration and innovation of technology. The deep integration of digital technology is a critical milestone in the modernization of Process Governance. Most global hotlines have built internet-based service platforms, significantly enhancing the convenience and transparency of services. The integration and innovative application of technology not only improve the intelligence level of hotline services but also provide strong support for urban governance modernization.

(2) Integration Degree of Organizational Structure

The degree of organizational structure integration is a key indicator for assessing the effectiveness of functional-side drivers in worldwide city hotline. The higher the degree of integration, the stronger the hotline's ability to handle complex issues and provide efficient services.

Firstly, efficient integration of internal management mechanisms. Cities like Beijing and Shanghai have designed efficient internal management mechanisms for their hotline systems. By establishing comprehensive strategic planning, standard norms, and work processes, they ensure consistency and coordination in hotline services, improving decision-making efficiency and implementation capabilities.

Secondly, tight integration of departmental collaboration mechanisms. The core of Collaborative Governance lies in the close coordination between departments. Beijing 12345 hotline has established tight linkages with government departments, enabling rapid task transfers and efficient problem-solving. In Shanghai, the 12345 hotline collaborates with emergency services such as police, fire, and medical hotlines, creating a rapid response mechanism for emergencies to ensure timely and effective assistance for citizens in urgent situations.

Thirdly, integration of external entities' collaborative cooperation. In addition to internal management and departmental collaboration, some hotlines need to establish extensive cooperative relationships

with external entities such as social organizations. The New York 311 hotline, for example, collaborates with community organizations and NGOs, providing diversified services to citizens. The integration of cooperation with external entities not only enriches the hotline's service offerings but also enhances the relevance and effectiveness of the services provided.

(3) Depth of Decision-Making System Integration

The depth of integration in decision-making systems is an important measure of the advisory role that worldwide city hotline play in supporting government decisions and providing smart governance insights.

Firstly, the depth of integration in hotline data management. Hotlines in cities such as Beijing, Wuhan, and Rio de Janeiro have established comprehensive data management systems, enabling real-time data collection, cleaning, storage, and analysis. This data covers all aspects of citizen demands, providing a rich information base for government decision-making.

Secondly, the breadth of integration in hotline data openness. Cities like Guangzhou, Hangzhou, Paris, and San Francisco are actively promoting data openness, collaborating with research institutions and universities to jointly explore the value of data and offer more diversified perspectives and solutions for urban governance. This open cooperation not only enhances the hotline's social impact but also promotes the transparency, scientific approach, and democracy of government decision-making.

Thirdly, the tight integration of reporting systems and policy adoption. The ultimate goal of Smart Governance is to support government decision-making. In China, 12345 hotline agencies regularly submit analysis reports and policy recommendations to the government, which are directly converted into policy measures. In cities like Tokyo and New York, hotlines also generate reports based on city hotline data to provide data support for government decision-making. A tight cooperation mechanism enhances the advisory value of the hotline and strengthens the relevance and effectiveness of government policies.

(4) Breadth of Service Response Integration

The breadth of service response integration is a key indicator for assessing the demand-side responsiveness of worldwide city hotline. It reflects the diversity and comprehensiveness of hotline service coverage and how resources are flexibly allocated and seamlessly connected across different service scenarios.

Firstly, the integration of diverse service scenarios. Hotlines in cities like Guangzhou and Nanjing have expanded service coverage beyond traditional phone consultations and appeal reporting, extending to emerging channels such as online interactions, mobile applications, and social media, achieving diversified and comprehensive service scenarios. Cities like Beijing, Singapore, Hong Kong, Tokyo, and Berlin have also made positive attempts with chatbots. These initiatives not only improve the accessibility and convenience of hotlines but also enrich the content and form of services, meeting citizens' diverse needs in various scenarios.

Secondly, the flexible allocation of service resources. Excellent city hotlines are able to flexibly

allocate service resources based on the urgency and complexity of citizen appeals, ensuring efficient and precise responses. Guangzhou 12345 hotline, for example, uses intelligent voice navigation to streamline the distribution of calls, reducing waiting time for citizens and improving operational efficiency. Hotlines in cities like Shanghai and Wuhan quickly activate emergency response mechanisms during sudden events, extreme weather, or large-scale appeals, reallocating operators and professionals to handle issues and ensuring timely and effective solutions for citizens.

Thirdly, the continuous optimization and integration of service quality. The ultimate goal of Smart Governance is to support government decision-making. In China, 12345 hotline agencies regularly submit analysis reports and policy recommendations to the government, which are directly converted into policy measures. In cities like Tokyo and New York, hotlines also generate reports based on city hotline data to provide data support for government decision-making. A tight cooperation mechanism not only enhances the advisory value of the hotline but also strengthens the relevance and effectiveness of government policies.

IV. Comparison of Value Realization

(1) Degree of Value Realization in Handling Appeals

The degree of value realization in handling appeals is a key indicator for assessing the effectiveness of the supply-side efforts of worldwide city hotline. It is not only reflected in the basic functionality of the hotline services, but also in how these services efficiently and accurately address citizen demands, leading to effective solutions and continuous improvement in urban governance.

Firstly, the degree of realization in channel diversity and appeal tracking. Hotlines such as New York 311 hotline and Toronto 311 hotline have integrated multiple channels, including phone, email, and apps, to provide diverse ways for citizens to voice their concerns. Additionally, these hotlines have developed comprehensive tracking systems across these various channels to monitor the progress and outcomes of appeals in real time, ensuring that every citizen request is properly addressed.

Secondly, the degree of realization in work order transfer and accurate handling. In Process Governance, work order transfer acts as a bridge between citizen demands and government services. Most worldwide city hotline have established standardized systems for identifying, categorizing, and transferring work orders, ensuring efficient and precise handling. This not only enhances the relevance and effectiveness of government services, but also reduces the intermediate steps and time costs involved in processing citizen appeals, enabling more timely and professional resolutions.

Thirdly, the degree of realization in service innovation and continuous optimization. Service innovation is an indispensable part of the value realization process. Hotlines in cities like Beijing and Shanghai have leveraged modern technologies such as artificial intelligence and big data analytics to continually optimize their service processes and service quality. This has improved the intelligent capabilities and efficiency of hotline services. Furthermore, these hotlines have established robust

user feedback mechanisms and service quality evaluation systems, allowing them to promptly identify and address issues, driving ongoing improvements and upgrades to hotline services.

(2) Degree of Value Realization in Governance

The degree of value realization in governance is a crucial measure of the functional impact of worldwide city hotline. As an important hub and platform for urban governance, the hotline promotes the improvement of the urban governance system and the enhancement of governance capabilities through cross-departmental collaboration and emergency response mechanisms.

Firstly, the degree of realization in strategic planning and collaborative leadership. 12345 hotlines in cities such as Beijing, Shanghai, Wuhan, Chengdu, and Hangzhou have established clear long-term development goals and set up collaborative governance mechanisms led by senior officials, ensuring that hotline operations are closely aligned with the broader goals of urban governance. This alignment, supported by strategic planning and collaborative leadership, provides solid organizational support and strategic guidance for Collaborative Governance.

Secondly, the degree of realization in standardization and inter-departmental coordination. City hotlines in places such as Seoul and New York have made significant progress in establishing service standards and inter-departmental coordination mechanisms. These hotlines not only develop detailed service standards and operational norms, but also establish efficient mechanisms for inter-departmental collaboration. The successful implementation of these standards and coordination mechanisms has not only improved the quality and efficiency of hotline services but also enhanced the synergy and integrity of the urban governance system.

Thirdly, the degree of realization in hotline consolidation and emergency collaboration. Hotlines such as China's 12345, North America's 311, Seoul's 120, and Rio de Janeiro's 1746 have demonstrated strong capabilities in hotline consolidation and emergency collaboration. By integrating multiple hotline service platforms, these cities have optimized resource allocation and unified service reception, effectively avoiding redundant infrastructure and resource waste. Furthermore, in emergencies, these hotlines can quickly activate coordination mechanisms to mobilize resources for prompt responses, ensuring the safety and stability of the city.

(3) Degree of Value Realization in Decision-Making

The degree of value realization in decision-making is directly linked to whether hotline data can be effectively transformed into scientific evidence for policy formulation and whether hotline services can drive innovation in urban governance.

Firstly, the degree of realization in service scenarios and the creation of governance lists. Over half of the city hotlines cover most service scenarios in urban governance. They provide data and formulate regular governance lists to address urban governance issues. Future efforts should focus on developing specific, regular, and targeted governance lists for challenging appeals to enhance the practicality and relevance of hotline services, providing more concrete references for government decision-making.

Secondly, the degree of realization in reporting systems and the level of policy consultation adoption.

China's 12345 hotline has performed exceptionally well in establishing reporting systems and gaining policy consultation adoption. It has not only developed a variety of reporting formats, including regular and special reports, but also actively submits policy recommendations and research reports to relevant government departments, offering valuable intellectual support for policy formulation. The reports from these city hotlines often enjoy high adoption levels in policy consultations, positively influencing government decision-making.

Thirdly, the degree of realization in digital governance innovation and continuous optimization. Some city hotlines have continuously explored and practiced digital governance by introducing new technologies and methods to enhance hotline service intelligence and innovate governance models. Cities like Singapore, Guangzhou, and Hangzhou focus on AI technology, large language models, and big data to leverage hotline and platform data resources. The establishment of a comprehensive user feedback and continuous optimization system could adjust and improve hotline services based on citizen needs and policy changes, thus providing more flexible and efficient support for government decision-making.

(4) Degree of Value Realization in Service Delivery

The degree of value realization in service delivery directly influences whether the hotline can effectively solve citizen problems, improve the quality of citizens' lives, and become a critical support for urban governance modernization.

Firstly, the degree of realization in the coverage and accessibility of service capabilities. Service coverage and accessibility are fundamental to the service and governance capability of city hotlines. In terms of service coverage, more than half of city hotlines cover nearly all common municipal service areas. The annual call volumes of Beijing 12345 hotline and Madrid 010 hotline exceed a ratio of 1.1 to the resident population, with the highest service coverage. From a comprehensive perspective, considering both call volumes and connection rates, the annual call volume of Beijing and Guangzhou's 12345 hotlines far exceeds 10 million, with connection rates exceeding 98.0% and 96.2%, respectively. Especially in Beijing, there is a notable demonstration of extensive service coverage and high efficiency in call connection rates.

Secondly, the degree of realization in the inclusivity and accessibility of services. Inclusiveness is a key trend in future urban development, and the accessibility of hotline services is an important dimension for assessing service quality. Measures such as providing personalized services around the clock ensure that vulnerable groups can easily access hotline services. From a service provision perspective, city hotlines in Beijing, Guangzhou, Shanghai, Seoul and other locations have set up 24-hour services, age-appropriate services, emergency services, and barrier-free services. Additionally, pioneering surveys on the residents' perception of these services in cities like Hangzhou, New York, and San Francisco suggested that providing adaptive reform is only the first step, and the next challenge is how to optimize the content and promoting them effectively.

Thirdly, the degree of realization in optimizing and improving service experience. Worldwide city hotline continue to focus on increasing trust and satisfaction. By continually improving service processes, enhancing service quality, and strengthening service oversight, they are increasing their

influence among citizens. Cities like Hangzhou and Xi'an emphasize the importance of public service values, adopting slogans such as “When the public calls, we respond” and “When the public calls, we act.” These cities have also incorporated business environment improvements into hotline service scenarios by creating dedicated business service lines and developing data platforms to optimize service processes.

V. Comparative Analysis Summary [7]

A comprehensive analysis of worldwide city hotline in terms of governance embeddedness, transformative driving force, system integration, and value realization leads to the following conclusions:

In terms of governance embedding, worldwide city hotline exhibit shared characteristics in the depth of their service provision, such as high call connection rates, diverse service channels, and precise tracking and handling of citizen appeals. Most cities achieve rational resource allocation and rapid responses by integrating hotlines with emergency services. The real-time responsiveness and efficiency of human operators, the thoughtful care reflected in age-friendly services, and the universal accessibility of inclusive and barrier-free services demonstrate the comprehensive and meticulous attention global city hotlines provide to citizens' needs.

For the transformation driving force, worldwide city hotline enhance governance quality through expanded coverage, service upgrades, channel optimization, and supply-side transformations. Unified reconstruction of institutional norms, efficient restructuring of inter-departmental collaboration, and integrative consolidation of hotline systems are key measures. However, significant regional disparities exist. Many cities increasingly use hotline data to support diverse service scenarios, systematize reporting frameworks, and improve the practical adoption of policy recommendations. Yet, issues persist in the effectiveness of resolving citizen appeals, public trust in hotlines, and satisfaction levels, all of which require further improvement.

Another aspect is the system integration. Worldwide city hotline demonstrate high efficiency in process optimization and resource coordination, reflecting effective collaboration and optimized resource allocation. However, in terms of organizational structure, while most cities have established internal management mechanisms linking hotlines with other institutions, they still lag in strategic planning for hotline-driven urban governance and in closely integrating mechanisms for cross-departmental collaboration. Moving forward, cities must maximize the utilization of diversified service channels and adopt advanced technologies for intelligent resource allocation, thus significantly improving hotline service quality and governance efficiency.

Finally, worldwide city hotline perform well in operational value realization but fall short in governance, decision-making, and service value. In terms of governance value, cities must develop strategic urban governance plans centered on hotlines to enhance collaborative leadership and establish standardized

protocols to strengthen departmental coordination. For decision-making value, hotline data must be deeply integrated with urban governance scenarios to foster continuous innovation in digital-intelligent governance and improve data-driven decision-making capabilities. Regarding service value, efforts should focus on expanding service coverage, accessibility, and effectiveness, ensuring a consistently enhanced service experience.

In summary, while worldwide city hotline show a positive development trend in service provision and governance effectiveness, they must continue to focus on integrating resources, optimizing collaboration, strengthening data governance, and improving service quality to achieve revolutionary advancements in urban governance.

Chapter 5

Case Studies of City Hotlines around the Globe

(The following cases are arranged alphabetically by the city name.)

1 Beijing 12345 Hotline: Transforming Megacity Governance by Addressing Citizens' Concerns

Case Overview

The Beijing 12345 hotline has nearly four decades of history. It has been upholding a people-centered development philosophy and evolving in step with the city's development, and has become a fine example of responsive governance innovation in China. In 2019, Beijing established a service mechanism centered around the 12345 hotline to swiftly respond to, efficiently process and offer prompt feedback to public concerns, benefiting both residents and businesses. This hotline sparked and ultimately solidified an innovative transformation of megacity governance through all-encompassing citizen engagement.

In its continuous iterations, the hotline has advanced hand in hand with Beijing's reform to provide swift response to public complaints, with both initiatives mutually complementing and reinforcing. The hotline-based swift response mechanism boasts a complete operational loop from receiving calls, assigning tasks and prompt resolution to supervision and evaluation. It leverages organizational advantages underpinned by Party building and legal safeguards, while providing intelligent and scenario-based governance and decision-making assistance. It has transformed the hotline from a highly effective and useful public service tool into a means of effective megacity governance.

Figure 5-1: Beijing 12345 hotline

Supported by the swift response reform, the hotline has become the "smart brain" and "efficient engine" for spatially targeted, scenario-based and collaborative urban governance, featuring a scientifically designed mechanism for categorizing and addressing complaints, an efficient response loop management system, comprehensive tracking and evaluation methods, and systemic solutions for scenario-based governance. This approach has offered not only practical experience but also a Chinese solution to the complex issue of megacity governance.

Best Practices

(1) One-Stop Platform for Responding to Complaints from Citizens and Businesses

Established in 1987, the Beijing 12345 hotline has evolved from a single telephone and three operators to a robust system with 750 workstations and more than 1,700 staff members. Initially focused on handling inquiries and complaints, the hotline has gradually expanded its scope. By integrating 64 government service hotlines into the 12345 platform and establishing over 20 online channels including Weibo, official WeChat accounts, and message boards for filing concerns, the hotline has become a comprehensive platform that combines telephone, short messages, website and mobile services.

The Beijing 12345 hotline leverages big data analytics to enhance decision-making support.

Figure 5-2: “One question per month" mechanism to solve the demand for the installation of elevators in old buildings

Over 100 million records of complaints, more than 3 million records from corporate entities, and information from over 7,000 communities or villages have been consolidated into a database. Thus, a big data analysis and decision-making platform has been created, with focuses on complaint volume analysis, category analysis, geographic distribution evaluation and listings of urban issues. The platform is shared across more than 50 government departments and provides data analysis reports to over 50 task forces. Through scenario-based data analysis, the hotline uncovers patterns and trends in citizen concerns, detects issues in advance, and proactively addresses frequently reported common complaints. Such an approach improves the city's governance capacity based on the hotline. Over the past six years of the swift response reform, the Beijing 12345 hotline has handled 150 million complaints, achieving resolution and satisfaction rates of 97% and 97.3%, respectively. In 2023 alone, 21.438 million cases were processed.

(2) Legal Safeguards to Consolidate the Reform's Spillover Benefits

Beijing has prioritized the role of the rule of law in solidifying the gains of its swift response reform. The city's enactment of regulations including the ordinance on the swift response to public complaints and the 12345 hotline service and management standards marked the transition of the reform from exploration to a stage of law-based, standardized and sustainable development. The regulations have fully enhanced the city's governance capacity and significantly increased public trust in the government. During the legislative process concerning the reform, three rounds of public consultation were conducted, collecting more than 9,000 suggestions from over 11,000 lawmakers, 67,000 grassroots workers and all residents. The suggestions were thoroughly reviewed and later incorporated into the draft regulation.

The prompt response reform embodies an effective model of listening to the people's genuine voices and capturing public sentiment, realizing a one-stop service system for the thorough resolution of concerns. This reform represents a profound revolution in urban governance, helps create an effective system of public oversight, and serves as an innovative practice of promoting whole-process people's democracy and improving public well-being.

(3) Supporting Government Decision-Making with Advanced Technology

Beijing has integrated the digital transformation of the swift response mechanism into its broader digital governance framework, and fully harnessed modern digital technologies to improve full-cycle hotline management, enhance data openness and upgrade services with intelligent technologies.

Specifically, Beijing employs the internet, big data, AI and blockchain technologies to build intelligent response and knowledge access systems. It has set up a knowledge base of addressed concerns that scientifically categorizes received complaints and boasts over 2,000 classification indicators spanning multiple hierarchical systems, thus enabling precise matching of complaints with responsible departments and realizing automated task allocation. The knowledge base has been opened to third-party platforms such as Baidu, enabling instant answers to frequently asked policy questions and allowing smart response robots to provide policy consultation services. The Beijing 12345 Service Map, developed in collaboration with third-party platforms, offers a comprehensive display of public services.

Figure 5-3: Beijing 12345 hotline

The hotline system analyzes user profiles and patterns of public complaints from vast records, conducts separate precise evaluations of responsible entities, and follows a mechanism of "daily reports, weekly analyses, monthly briefings and annual reviews." Key documents include the evaluation report on the swift response reform, the annual data analysis report of the 12345 hotline, and the annual diagnostic report on the swift response reform. These reports examine trends and patterns in public complaints, provide early warnings of potential social risks, support the government in diagnosing governance issues, promote data-driven government decision-making, policy implementation and evaluation, and offer precise policy suggestions. They can also facilitate the shift from reactive one-off responses to proactive data-driven governance.

(4) Promoting Integrated Urban Governance Through Categorized Scenarios

The governance innovation driven by Beijing's swift response reform reveals an upward evolution of the city's hotline governance model. This reform transcends the traditional single-dimensional governance approach, creating a comprehensive model based on prioritizing key governance spaces, seeking the resolution of tough issues, and boosting collaboration among diverse governance entities.

Beijing evaluates the effectiveness of handling complaints through metrics such as response rate, resolution rate and satisfaction rate, and analyzes year-on-year and month-on-month changes in parameters like the number of complaints per 10,000 residents and the baseline complaint ratios. These insights are combined with local characteristics and governance needs to provide targeted guidance and assistance for key neighborhoods and townships and enable systemic improvements in critical areas.

Using big data mining, the 12345 hotline identifies prominent livelihood issues and governance bottlenecks from the vast database of complaints, and pinpoints high-frequency and common issues in varied fields. Through special programs like monthly themed activities, the hotline addresses key issues in a targeted manner, escalates responses, and launches targeted campaigns to tackle high-priority issues.

In addition, Beijing effectively taps the resources and strengths of diverse governance entities to foster the government's collaboration with enterprises, society and residents. For instance, green channels have been built in partnership with platforms like JD.com for the rapid resolution of consumer disputes, raising the efficiency in handling such cases. Similarly, community-level consultative initiatives like neighborhood meetings empower residents to independently resolve public issues through self-governance. This collaboration among diverse governance entities enhances the inclusiveness and adaptability of urban governance.

Valuable Experience

To address the complex challenges of megacity governance, Beijing has tackled "big city malaise" using the 12345 hotline as the primary channel for urban governance driven by addressing public complaints. Relevant departments focus on solving problems, aiming to enhance each citizen's sense of gain through solving individual problems and address systemic issues by formulating policies that solve various categories of problems. Practice has shown that problems can serve as the starting point of action and innovation. Only by identifying and resolving real issues can reforms achieve their intended results, breaking new ground and driving progress across all sectors.

Beijing's experience offers experience in five aspects: (1). Putting people first and taking meeting people's demands as the ultimate goal. (2). Staying problem-oriented and developing new solutions and mechanisms for resolving specific challenges. (3). Applying systems thinking and raising megacities' capacity for integrated and refined governance in managing key governance units, dealing with special scenarios, and coordinating diverse governance entities. (4). Upholding the rule of law and strengthening the institutional foundation for grassroots governance in megacities. (5). Pursuing comprehensive governance, combining the resolution of public complaints with urban management, and using cutting-edge tools and tailored mechanisms to create a closed loop from perceiving urban preferences to achieving intelligent urban governance.

2 Berlin's 115 Hotline: Enhancing Technological Innovation and Optimizing Public Service Resource Allocation

Case Overview

The Berlin 115 hotline began its trial operation on March 24, 2009, and was officially launched on April 14, 2011. By connecting the call centers of federal, state and local government agencies through a shared knowledge management system, the hotline has significantly improved public services. Currently, the hotline is making extensive strides in the field of intelligent services. Notably, the development and application of the 115 chatbot and the 115 voice interaction system have provided effective solutions to address the growing demand for public services and facilitated the optimization of public service resource allocation. Moreover, by analyzing and processing vast amounts of data, the chatbot and the voice interaction system offer intelligent decision-making support to the government, playing a key role in enhancing the capacity of digital governance.

Best Practices

(1) Building an Intelligent Voice Interaction System

The Berlin 115 hotline launched its intelligent voice interaction system in the spring of 2024. This system assists users in getting the information or services they need and efficiently answering common questions, freeing up more time for service centers to handle complex issues and thus improving response efficiency. If the voice interaction system cannot provide an answer, service centers are available during working hours to address the concerns. Moreover, the system allows citizens to access administrative information and services around the clock, enhancing the accessibility of hotline knowledge services and addressing the rising volume of inquiries. The Berlin 115 hotline is planning to expand the range of services offered by the voice interaction system.

The intelligent system is also equipped to meet multilingual needs, automatically matching appropriate service resources based on citizens' requirements. It provides multidimensional services and information across different governmental levels, regions and departments to realize one-stop solutions. This grants equitable access to government services across different regions, improves public satisfaction, and fosters social harmony and stability.

(2) Developing the 115 Chatbot

Currently, the Berlin 115 hotline is testing the chatbot in 10 pilot cities to address issues related to administrative services. Following successful testing, the innovation will be rolled out across the entire 115 network. By developing the chatbot, the hotline has created a round-the-clock digital access channel for the first time. Even outside the operating hours, the 115 hotline can reliably provide citizens with information on administrative services and respond swiftly to their inquiries. The

development and testing of the chatbot are carried out by the product management department of the Federal IT Cooperation (FITKO). It draws on the Berlin 115 hotline's knowledge base as well as local government knowledge bases to answer questions on administrative services.

Accuracy is paramount for information provided by the hotline. To avoid the dissemination of false or fabricated government statements, the 115 chatbot has been developed entirely based on rule-based systems, without relying on AI-powered language models. According to officials in charge of the project, future plans include expanding the chatbot's functions using AI technologies and integrating knowledge bases from multiple local governments.

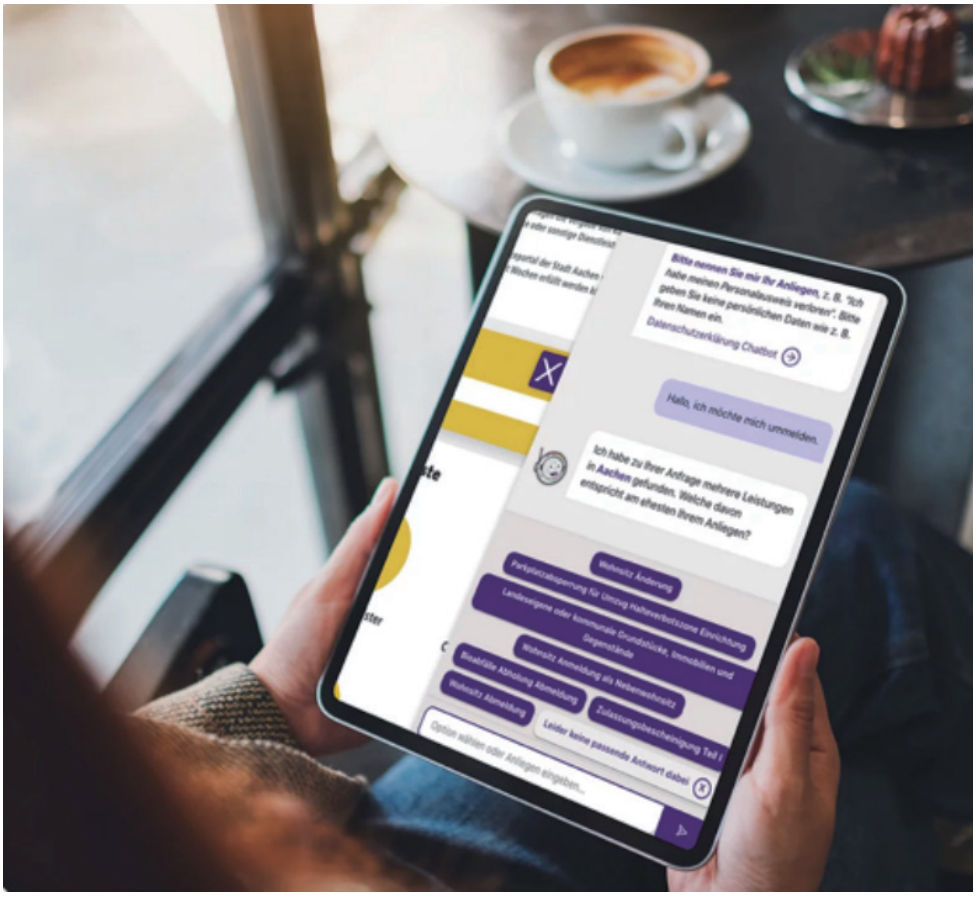


Figure 5-4: The 115 chatbot

(3) Providing Intelligent Support for Decision-Making

Berlin's 115 hotline demonstrates the potential of systems built on information integration and rule-based design through the development and implementation of its voice interaction system and the chatbot. By collecting and analyzing public inquiry data in real time, the chatbot and voice interaction system enable the hotline to gain deeper insights into citizens' needs and their access to services, facilitating timely adjustments and optimizations in service strategies. By leveraging historical data and real-time feedback, the system can forecast future service demand and development trends, and thus help the government make more scientific policies and measures.

Valuable Experience

In advancing its exploration of intelligent systems, the Berlin 115 hotline prioritizes technological support, pushes for continuous innovation and plays a leading role in Germany's digital government transformation. As information technology evolves, the capabilities of the chatbot and the voice interaction system will continue to improve, while the application of artificial intelligence offers broad prospects for the transformative improvements of the intelligent projects. These advancements will help the 115 hotline deliver more diverse, efficient and personalized services to meet the growing needs of citizens. Moreover, by analyzing and processing vast amounts of data, the chatbot and the voice interaction system provide the government with smart decision-making support. This data-driven approach is crucial for accelerating digital transformation and enhancing governance capabilities.

In terms of service quality, although the Berlin 115 hotline is a front-runner in adopting intelligent technology, it remains committed to human interaction and personalized services. Hotline service staffers are required to maintain a friendly demeanor when answering, handling and concluding calls. To ensure service quality, all employees answering calls must undergo related training. The time taken to pick up calls is also a key measure of hotline performance. According to official documents, the hotline has set its target as "80/20," meaning that 80% of calls should be picked up within 20 seconds.

3 Chengdu 12345 Qinqing Online: Multichannel Coordination for Regular Enterprise Services

Case Overview

Chengdu has adhered to the guiding principle of building a hotline of the people, and showcased its commitment to serving the people with the goal of creating a direct link with the people. Leveraging the construction of a smart city and aiming to boost market entities' sense of gain, Chengdu has optimized its business environment and improved the workflow for serving enterprises through the 12345 Qinqing Online platform, which is centered around its 12345 enterprise support hotline. Such efforts have improved overall efficiency, offered high-quality, comprehensive enterprise services, and turned the 12345 Qinqing Online into a calling card for optimizing the business environment.

Figure 5-5: Telephone center of the Chengdu 12345 hotline

Best Practices

(1) Building a Professional Team to Address Enterprises' Complaints

Chengdu has optimized its service framework featuring dedicated workstations, personnel and task force, and formed a special 12345 hotline think tank of a new type. On one hand, the city set up

the 12345 enterprise support hotline with 20 dedicated service seats, operating around the clock to handle enterprises' inquiries. Additionally, 48 enterprise service specialists were appointed to manage urgent communication, ensure routine liaison and make complaint analysis reports. On the other hand, a fast-track task force for addressing enterprises' complaints via the hotline was established. The task force is coordinated by municipal-level leadership and headed by two officials at the deputy director-general level under municipal supervision, with 26 officials from various city departments as the members. On a regular basis, this task force tackles typical cases and complex cross-regional, cross-level and cross-departmental issues through expedited measures such as pressing for swift response, joint consultations, on-site supervision and direct reporting to municipal leaders. Highly urgent cases with broad implications or potential to generate significant public attention that cannot be resolved after being studied by the heads of the task force should be transferred to the principal leaders of the municipal Party committee and municipal government, as well as related leaders in charge, for higher-level coordination. In 2023, the task force expedited or escalated the coordination levels for over 22,000 complaints from enterprises and brought more than 50 cases to the city leadership for high-level intervention.

Figure 5-6: Chengdu 12345 hotline task force

A special, novel think tank has been established under the 12345 hotline. The think tank selects outstanding officials and members of the public who possess practical experience and research and

analytical skills. Based on the hotline's rich data resources, it identifies and analyzes bottlenecks and challenges in enterprise development to support the municipal Party committee and municipal government in making targeted decisions. Since its inception in August 2023, the think tank's 108 members have produced 56 reports. Some recommendations on addressing enterprises' complaints have already been translated or are being translated into policies and measures.

(2) Innovative Application Scenarios to Provide Multi-Channel Services for Enterprises

Chengdu integrates four key service models, the 12345 enterprise support hotline, Rongyiban, Rongyixiang and Rongyijian, and launches innovative application scenarios such as Rongyidai and Rongyiyong under the "Rongyi+" brand. These services offer comprehensive enterprise services, including those related to administrative procedures, policy transparency, government-enterprise interactions and offline communication. The goal is to deliver more convenient, high-quality, efficient and fair services to all types of businesses.

The Rongyiban platform connects the provincial integrated government service platform with municipal and county-level administrative systems, creating a closed-loop service process. It promotes non-discriminatory acceptance, standardized processing and seamless integration of online and offline services. The Rongyixiang platform ensures that enterprises can directly enjoy favorable policies, with the launch of a system for proactively informing enterprises of the favorable policies they can enjoy. It aggregates all support policies in a one-stop service system. By utilizing the profiling of policies and enterprises, the platform has gradually achieved intelligent matching and proactive policy notifications. It has also set up a policy livestreaming channel for policy interpretation and

Figure 5-7: The 12345 enterprise support hotline, Rongyiban, Rongyixiang and Rongyijian

Q&A sessions, thereby better informing enterprises of favorable policies. The Rongyijian platform establishes regular and institutionalized offline communication mechanisms between the government and enterprises. Senior officials from various departments participate in symposiums, coffee time activities and breakfast discussions to address issues faced by businesses directly. These efforts aim to provide businesses with more accessible, high-quality, efficient and equitable services.

(3) Comprehensive Collaboration to Address Common Issues

Chengdu adopts a multifaceted approach to optimize its business environment through citywide high-level coordination, expedited resolution processes, comprehensive follow-ups, in-depth analysis and extensive media publicity. For high-level coordination, the mayor and deputy mayors convene regular or ad hoc 12345 Qinqing Online meetings to address bottlenecks and common issues affecting the opening and development of businesses. District and county leaders hold monthly meetings to resolve region-specific major issues and common concerns of enterprises.

Building on existing enterprise services, the city launched an "express lane" for filing project-based complaints with the 12345 hotline. Handling departments are required to provide expedited processing with a strict deadline — giving an initial response within two hours, verifying issues on-site within 24 hours, and reporting resolution outcomes within three working days. Comprehensive follow-ups by hotline staffers are then conducted for all cases filed through the hotline. For any unsatisfactory resolution, the principal official of the responsible entity must personally coordinate to expedite the resolution process. Since May, on-site visits have been conducted in collaboration with development and reform authorities to address complaints raised by specialized and sophisticated enterprises that produce new and unique products.

Utilizing a multidimensional data analysis platform, the 12345 system conducts real-time analysis of enterprise complaints across varied time periods, regions and event types. It also carries out thematic analyses of common enterprise issues, and improves the system of holding weekly themed activities to focus on a category of recurring problems each week and submit a special report that will be sent to municipal leaders in charge for higher-level coordination. In addition, by linking hotline data with industry data, the system can identify bottlenecks and challenges in the business environment and help the municipal Party committee and municipal government make targeted and scientific decisions.

The 12345 Qinqing Online prioritizes media publicity and guidance by actively collaborating with traditional news outlets and new media platforms. It has launched publicity initiatives such as the daily "12345 with You" and weekly "12345·Follow-Up" to address common and pressing concerns of enterprises in a timely manner. The platform also organized a large-scale offline event on discovering the city through the 12345 hotline, inviting representatives of enterprises and self-employed individuals to experience the 12345 services firsthand, provide feedback and offer suggestions, thereby fully leveraging the hotline's role in publicity and guidance.

Valuable Experience

Building on its practices of setting up dedicated service workstations for businesses, assigning enterprise service specialists, organizing a dedicated fast-track task force for addressing enterprises' complaints, and creating a special, novel think tank, Chengdu's 12345 Qinqing Online also integrates four key service models: the 12345 enterprise support hotline, Rongyiban, Rongyixiang and Rongyijian. Through multifaceted collaboration, diverse services and multi-scenario applications, it focuses on addressing tough issues, critical bottlenecks and pain spots in corporate development. Complemented by higher-level coordination, an "express lane" for filing complaints, multidimensional real-time data analysis, and comprehensive media coverage and guidance, the platform not only provides enterprises with full-cycle, full-process and all-encompassing services but also ensures swift resolution of their complaints as a routine practice. It can effectively address the common challenges in creating a business-friendly environment, thus contributing to optimizing the city's business landscape.

4 Guangzhou 12345 Hotline: Building a Service System of Intelligent Human-Computer Interaction

Case Overview

The Guangzhou 12345 hotline has actively explored the application of AI, large language models, big data and other technologies, and made significant strides in developing an AI laboratory. By fully empowering hotline services with AI technology, the city has promoted the transformation from a traditional human-operated system to a model featuring intelligent human-computer interaction, leading to a significant leap in service quality and efficiency.

Figure 5-8: Call center of the Guangzhou 12345 hotline

Best Practices

(1) Smart Recognition of Citizen Intentions Significantly Reducing Wait Time

In December 2023, the Guangzhou 12345 hotline deployed a bilingual smart voice navigation system in Mandarin and Cantonese. Citizens can simply state the key content of their concerns, and the system will use speech recognition to intelligently direct the call to the appropriate service queues, eliminating lengthy and multi-layered voice menus and reducing both button presses and wait time.

The smart voice navigation assistant uses cutting-edge technologies including AI, automatic

Figure 5-9: The smart voice navigation of the Guangzhou 12345 hotline

speech recognition, natural language processing and text-to-speech technology. It focuses on the most frequent and concentrated problems and requests from citizens and enables intelligent navigation of citizen calls. The system accurately understands citizens' intentions through voice modeling and interaction, and then transfers the call in real time to a skilled human agent for more professional consultation and services.

Thanks to the smart voice navigation assistant, the average wait time for citizens to be connected to a human agent has been reduced by 43%, significantly improving user experience and enhancing the operational efficiency of the Guangzhou 12345 hotline.

(2) Upgrading the Smart Hotline Agent System and Achieving an Assignment Accuracy Rate of over 97%

The Guangzhou 12345 hotline's smart agent system uses technologies like AI-based voice transcription, large language models and big data analysis to convert the voice of calls into text. The text is then processed to extract complaints and conversation summaries. The approach makes the description of complaints more concise and focused, boosts the efficiency of call center responses, reduces the time and effort required to fill out forms, and improves service effectiveness and quality. In the meantime, using a map-assisted feature, the system can instantly retrieve address information mentioned by callers, helping human agents provide more accurate and faster answers and record the information in forms.

The intelligent assignment system combines large model recommendations with a database of expert-defined rules to continuously optimize and refine the assignment model. Through methods

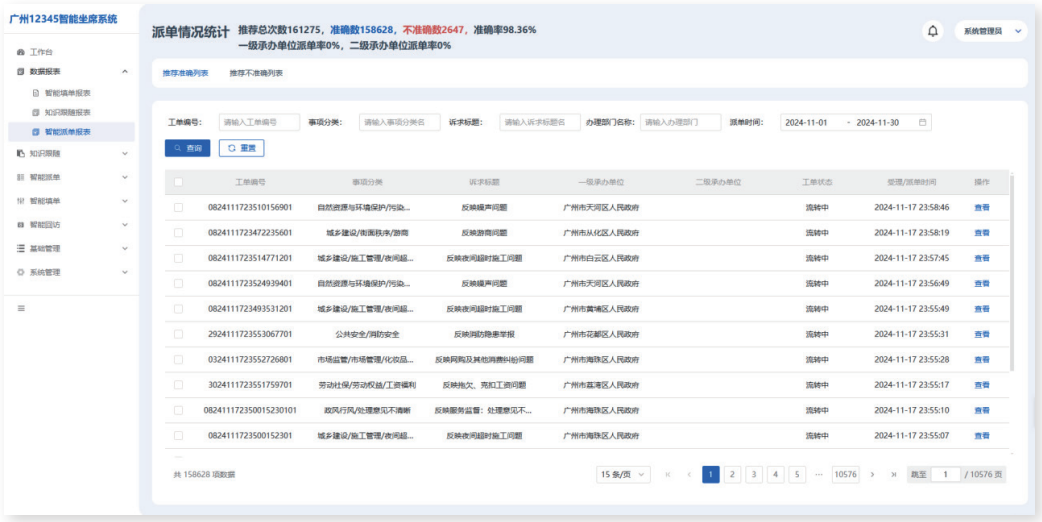


Figure 5-10: Smart assignment function of the Guangzhou 12345 hotline's smart agent system

like learning from historical hotline forms, post-rejection corrections and artificial interventions, the system learns and corrects itself during operation and steadily improves assignment accuracy. Once a conversation is completed, the system automatically assigns tasks to the appropriate departments based on the type, content and address information of complaints, without the need for human intervention.

The intelligent assignment system supports task allocation to both first- and second-level service departments. It also intelligently makes a new recommendation after an assigned task is rejected. Currently, the system covers 90% of first-level service departments and 60% of second-level departments, with an assignment accuracy rate exceeding 97%. The intelligent assignment feature has drastically reduced errors in assigning tasks, and enabled related departments to process complaints more efficiently, thus creating a positive loop of more accurate assignments, faster processing and greater citizen satisfaction.

The smart agent system can also perform real-time quality checks on call services, effectively standardizing services, conducting service quality oversight, and providing strong support for improving the quality and efficiency of the hotline services.

(3) Creating Smart Q&A Scenarios to Provide Precise Answers

The Guangzhou 12345 hotline focuses on hot topics in government services and has established a well-structured, intelligent and scenario-based knowledge base. The knowledge base has incorporated 218 scenarios across nine major service areas, such as social security, medical insurance, housing provident fund, enterprise services, general services and public security, with more than 2,600 sub-scenarios. The system also optimizes self-service inquiry services and upgrades the section for quick searches on the hotline's official WeChat account. Combining hot topic recommendations, topic selection and free search options, the feature on the WeChat account offers a public service knowledge encyclopedia that makes it easier for citizens to access and more accurate policy information.

Based on years of consultation data, the Guangzhou 12345 hotline has developed an intelligent online service system. Using natural language processing technology as the core, the system upgrades the traditional search-based inquiry model to a human-computer interaction model that supports intent understanding, multi-turn dialogue and knowledge recommendations. This greatly improves the accuracy and convenience of consultation services, with increasing numbers of enterprises and citizens using the online service system to access policies and operation guidelines and enjoy more convenient and intelligent government services.

The Guangzhou 12345 hotline has also developed an intelligent knowledge following function. The system understands citizens' concerns by analyzing the semantic elements, automatically generates a script map, and accurately identifies the business scope to provide service guidance. The knowledge base not only supports intelligent search but also sends high-frequency knowledge points related to citizens' complaints to call agents, achieving intelligent knowledge following. Currently, the accuracy rate of knowledge following recommendations exceeds 90% in Mandarin-speaking scenarios. This function effectively reduces the workload of call agents in searching for knowledge and enables them to quickly respond to citizen requests based on the recommendations, thereby shortening citizens' waits and improving service experience.

(4) Activating the Potential of Hotline Data to Promote Digitalized Grassroots Governance

The Guangzhou 12345 hotline delves into the data of complaints from citizens and enterprises, releases monthly reports on public sentiment, and analyzes over 15 million hotline data records annually. It has included 120 topics such as education, product quality and enterprise migration into public and business attention rankings. The system transforms "weak signals" of public opinion into "strong information" for driving work forward, and helps with the digital transformation of megacity governance.

For example, in old neighborhoods without property management teams, issues like damaged public facilities can become challenges in terms of who should be responsible and how the issues should be addressed. The hotline plays a frontline role in grassroots governance by promptly identifying citizens' urgent concerns. In one edition of the monthly public sentiment report, the hotline analyzed issues related to public facilities, such as pipeline leakage affecting residents' lives, and made specific recommendations for relevant departments to strengthen research and solve the issues. In Nanshitou Sub-district of Haizhu District, the Zhibei neighborhood committee took the initiative to coordinate with residents to successfully replace six drainage pipes. The move greatly improved the living environment, and received extensive media coverage.

The Guangzhou 12345 hotline has also launched the "Public Sentiment Calendar" function on the small-screen version of "Suizhiguan," an urban management hub, to provide regular references and early warnings for relevant departments. At the same time, it conducts targeted governance by focusing on long-standing issues such as unpaid wages and illegal parking, conducts in-depth research, forms task forces, and collaborates with local and industry authorities to produce reports after research and push for the resolution of pressing issues.

Moreover, the hotline analyzes key public complaints to formulate specific work plans, strengthens coordination among supervision, statistics, reform and other departments, and forms a closed-loop management system for resolving common issues, thereby facilitating departmental reforms and effectively addressing citizens' urgent concerns.

Valuable Experience

The Guangzhou 12345 hotline stands out for empowering its entire workflow with AI technology and deeply mining data in driving the modernization of grassroots governance. On one hand, it uses smart voice navigation and natural language processing to streamline the handling of complaints and reduce the average waiting time. It optimizes the smart agent system and assignment algorithms to improve task-assigning accuracy and efficiency. At the same time, by building a structured, intelligent and scenario-based knowledge base and developing the intelligent knowledge following function, the system enables efficient human-computer interaction and the transition from searches for answers to understanding demands, multi-turn dialogue and knowledge recommendations. Through technological innovation and service process optimization, the hotline has effectively enhanced public service capacity and significantly improved public satisfaction.

On the other hand, through mining and analyzing hotline data, the system helps the government quickly detect major social concerns, predict changes in complaints, and proactively address governance challenges with foresight. This data-driven governance approach enhances public trust in the government, ensures scientific decision-making, optimizes public resource allocation, raises the overall quality of services, and drives grassroots governance toward greater modernization, intelligence and precision.

5 Hangzhou 12345 Hotline: Enhancing Service Experience for Enterprises Through Digital Reform

Case Overview

Hangzhou's 12345 hotline places a strong emphasis on data integration and intelligent applications. With digital reform as a driving force, it has significantly improved the efficiency of handling business-related matters and the overall service experience by continuously refining regulations, upgrading platform systems and optimizing service procedures. The hotline has established a comprehensive system that covers the entire service cycle, provides around-the-clock responses and serves the entire city.

Best Practices

(1) Advancing and Sharing Data Integration

To address citizens' concerns, the Hangzhou 12345 hotline has established a targeted data-sharing mechanism. By collaborating with the Hangzhou Municipal Administrative Approval Service Management Office, data barriers have been broken down. The module for responding to enterprises' complaints has been optimized, and the tagging system and data matching standards have been refined to align 306 categories in the business environment catalog with 223 tags for addressing enterprises' concerns. In partnership with the Hangzhou Municipal Market Regulation Bureau, the hotline also connects the city's public complaint resolution platform with data on enterprises, particularly small and medium-sized enterprises. By categorizing business-related issues, the system enhances service quality and efficiency, improves information warning capabilities, and ensures a quick and accurate response to enterprises' needs, thus aiding in the optimization of the business environment.

Figure 5-11: Hangzhou's intelligent platform for addressing complaints from enterprises

Hangzhou Chuangshe Trading Co., Ltd. sought to join a local industrial park for cross-border or foreign trade businesses, but since the company's legal representative was abroad and could not visit the administrative service center for consultation. After making a call, the 12345 hotline used the business service platform to automatically verify the company's name and registered address, categorize the problem it encountered, and forward the case to the relevant department for approval. The department responded on time, providing all necessary information to the company in one go, significantly improving the efficiency of the process.

(2) Intelligent Knowledge Base Empowering Preemptive Action

To alleviate the pressure from a growing number of cases, the Hangzhou 12345 hotline has developed and launched intelligent features like an intelligent knowledge base, smart response, smart assignment, smart quality control and intelligent analysis. These functions ensure precise task assignment and the efficient use of vast amounts of data. In 2024, the knowledge base was fully upgraded to build an intelligent platform with a one-stop service portal for the hotline service staff, providing search, collection and error correction functions to reduce mechanical responses. A public knowledge base was also established, enabling businesses and citizens to access information in advance through the system, facilitating "preemptive action" and greatly improving user experience.

Figure 5-12: Hangzhou's intelligent knowledge base

Since the beginning of 2024, a total of 94 departments have updated 2,881 entries in the knowledge base, corrected 157 indexing errors, and continuously improved the smart knowledge base. Thanks to this system, the 12345 hotline's response rate for business environment-related issues reached 94.37%, with a satisfaction rate of 99.51%.

(3) Using AI to Raise Service Capability and Efficiency

The Hangzhou 12345 hotline platform continues to optimize its intelligent assistance features by incorporating 3,295 intelligent classification items across three levels, reaching an accuracy rate of 86.7% in giving recommendations. Smart task assignment can automatically recommend 109 departments, and smart quality control now covers all interactions, significantly enhancing the overall oversight efficiency. Led by the city-level platform, district and county platforms have continued to strengthen their data-driven capabilities, taking new measures and improving the efficiency of serving businesses.

For example, Xihu District launched a business assistance module on its public service platform, which quickly responds to policy-related questions of businesses. Through this module, businesses can access new policy information and avoid missing out on opportunities due to delayed information. In Yuhang District, the "AI Yuhang" smart government service application has been piloted, using Alibaba's Tongyi Qianwen large language model and the 12345 hotline's knowledge base to build an intelligent knowledge platform covering multiple fields, including social security, medical insurance, housing provident fund, public security, human resources and education. The smart application provides around-the-clock online services, making government services more efficient and accessible.

(4) Intelligent Analysis to Track Governance

The Hangzhou 12345 hotline platform has built a public opinion data pool, using heat maps for public opinion analysis to visually display areas and sectors where issues are concentrated. It has created a data analysis model to manage industries with prominent issues by citizens' complaints and manage districts, counties and townships with prominent issues following a color-coded approach. Dynamic monitoring of departments, districts, counties and industries is used to generate health check reports, which are instantly sent to the relevant leaders through the "Zhezhengding" platform to facilitate decision-making. At the same time, the platform focuses on key sectors, industries, businesses and concerns, thereby tackling both specific and general issues and improving governance effectiveness.

For instance, to address the rapid increase in complaints about prepaid consumption, the Hangzhou 12345 hotline has introduced a "prepaid card consumption business risk warning" model. By combining 12345 complaints, police reports and other grassroots governance data and integrating basic information on people, real estate and enterprises, it uses AI models to analyze key indicators like frequent complaints, police reports, disputes and business registration changes, and automatically identify and warn of risks such as business closures in advance. The system has already issued 55 early warning messages, effectively resolving conflicts before they escalate and thus turning governance challenges into reform opportunities.

Figure 5-13: Prepaid consumption risk warning model of Hangzhou's Gongshu District

Valuable Experience

The Hangzhou 12345 hotline's core strategy for improving services is strengthening data integration and leveraging smart applications. On one hand, by establishing a targeted data-sharing mechanism and enhancing cross-departmental cooperation, the system breaks down data silos to allow for more precise categorization and tags for business-related services. This move has made enterprise services much more efficient and targeted.

On the other hand, the platform uses intelligent technologies to optimize functions and enhance public opinion data analysis, greatly improving the quality and efficiency of government services. The building of an intelligent knowledge base and a smart response system has not only increased service efficiency but also enabled citizens and businesses to easily access information, thereby enhancing service accuracy and user satisfaction. Meanwhile, by building a public opinion data pool and a multidimensional analysis model, the platform can accurately identify major complaints of citizens and prominent issues in specific industries and localities. It also tracks the progress and effects of the handling by different departments in real time to ensure timely resolution.

6 Hong Kong 1823 Hotline: A One-Stop, Intelligent and Precise Hotline

Case Overview

The Hong Kong 1823 hotline is committed to creating a platform for government-citizen interaction, adhering to the principle of service from the heart. By enhancing personnel training, updating knowledge, exploring the application of emerging smart technologies and promoting a culture of proactive service, the hotline acts on the government's firm commitment to improving public service standards, leverages technology to improve people's lives and continuously enhances its one-stop service capabilities. It offers valuable lessons for the development of hotlines in other cities.

Best Practices

(1) One-stop Streamlining of Procedures and Operations

The Hong Kong 1823 hotline's one-stop service model breaks down traditional barriers among government departments, enabling effective integration and optimization of service resources. The hotline consolidates the services of various departments and offers around-the-clock service all year round in Mandarin, Cantonese and English.

To ensure the smooth operation of one-stop service, the hotline has established effective internal coordination and interdepartmental cooperation mechanisms. Dedicated management personnel are appointed as liaison officers, responsible for daily communication and coordination with relevant departments, updating the knowledge base with information provided by the departments, and proactively offering the latest response materials to the government based on social incidents.

Figure 5-14: Search platform on the Hong Kong 1823 hotline's website

Moreover, as a vital communication bridge between the government and citizens, the hotline records every complaint, promptly transfers it to the relevant department, follows up on the progress and informs the citizen of the progress. In cases where a complaint involves multiple government departments with unclear responsibilities, the hotline service staff will consult with relevant departments within two days to determine a way of resolution. Government departments and the hotline follow the principle of resolving problems first and discussing responsibilities later to swiftly address citizens' concerns.

(2) Enhancing Efficiency and Experience with Smart Technologies

The Hong Kong 1823 hotline fully utilizes modern information technology to achieve an intelligent transformation of its services. Its smart system integrates advanced technologies such as natural language processing and machine learning, storing service information from various government departments in a computer database. By entering a keyword, users can quickly access relevant information.

To improve efficiency, the hotline established a complaint intelligence system in 2009, using SAS text mining technology to analyze the root causes of social issues and optimize resource allocation.

Figure 5-15: Intelligent chatbot on the Hong Kong 1823 hotline's website

At the end of 2019, chatbots were introduced on both the hotline website and phone service, enabling intelligent interaction to accurately understand citizens' queries and quickly retrieve information from the knowledge base. In this way, they reduce waits and improve hotline service efficiency.

The 1823 hotline has also launched an app that integrates various functions, such as searches, complaints and suggestions, providing citizens with a more convenient and intelligent service experience through features like smart notifications and voice assistants.

(3) Targeted Services to Ensure Quality and Effectiveness

The Hong Kong 1823 hotline boasts a well-trained and highly efficient service team. After being hired, hotline service personnel undergo one month of training on the hotline system and various departments. Once they pass the assessment, they are assigned to different teams to handle inquiries and complaints from citizens. To mitigate potential negative emotions when handling challenging calls, the hotline regularly holds experience-sharing sessions and invites service staffers to participate in courses on managing emotions and work-related stress. Furthermore, the hotline has established an award for handling highly difficult calls to reward staff members who handle complaints objectively and calmly.

The hotline has also implemented a strict quality control system and performance evaluation mechanism. Supervisors assess service capabilities based on specific indicators to ensure that hotline service staff can accurately understand citizens' needs and demands when handling inquiries or complaints, carefully analyze the nature and urgency of the issues, and follow standard processes and

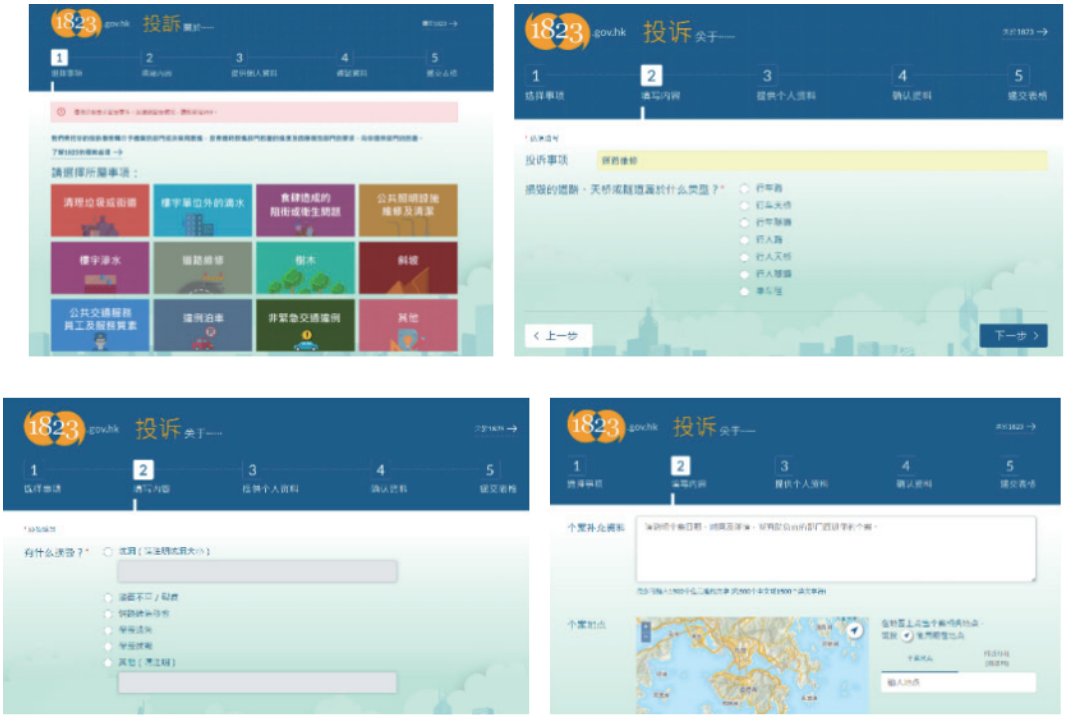


Figure 5-16: The Hong Kong 1823 hotline's complaint page

timelines to provide targeted solutions.

For different types of complaints, the hotline provides various templates on the website, with detailed sub-categories under each issue. For example, when reporting road repairs, citizens must first choose the category of road maintenance on the complaint webpage, select the type of the damaged road and the problem, and finally provide additional information and use a map function to give the location. The hotline also encourages citizens to submit their opinions and suggestions via the feedback channel to further optimize service content and methods.

Valuable Experience

The Hong Kong 1823 hotline is dedicated to building a one-stop, intelligent and targeted platform for government-citizen interaction. It offers the following experience for the development of hotlines in other cities:

First, enhancing training and knowledge updating to improve professional competence and service capabilities of service personnel. Hotline service personnel should undergo strict training and assessment, and regularly participate in experience-sharing sessions and training courses. This ensures that they possess the professional knowledge and skills to quickly respond to citizens' inquiries and complaints.

Second, proactively embracing new technologies to make government services more intelligent. City hotlines should constantly explore the application of new technologies such as AI and big data. It is important to combine traditional service methods with modern technological tools like smart voice assistants and virtual reality to make services more efficient and intelligent and to offer citizens more convenient and intuitive service experiences.

Third, encouraging proactive services and a citizen-centered approach and swiftly respond to citizens' complaints. The Hong Kong 1823 hotline advocates for the principle of resolving problems first and discussing responsibilities later. Hotlines in other cities can learn from this by focusing on quickly and effectively solving problems after receiving complaints, rather than placing blame. This approach improves the efficiency and quality of issue resolution.

7 London GLA Platform: Enhancing the Quality and Efficiency of Responses to Complaints Through Digital Government-Citizen Interaction

Case Overview

The Greater London Authority (GLA) is responsible for policymaking and execution in the Greater London area. It is committed to engaging with citizens through multiple channels to ensure their voices are heard and encourage their involvement in urban policymaking. On its official website, the GLA provides a centralized platform for service feedback and complaint handling, ensuring that citizens' complaints about government services are effectively addressed. With the widespread use of the internet, more and more London residents are opting to provide feedback to the government through this platform.

Best Practices

(1) Integrating Complaint and Oversight Channels

The GLA platform is designed with simplicity, integrating common complaint channels for areas such as transport, policing, municipal work and fire services. It includes dedicated sections for each category of complaint, where users can click through to reach the relevant department's complaint portal. This simplifies the administrative process for categorizing and assigning complaints and allows the respective departments to directly handle them, thus more efficiently assigning complaints to the relevant authorities and enabling more targeted feedback. This approach improves the efficiency of complaint resolution and saves administrative resources.

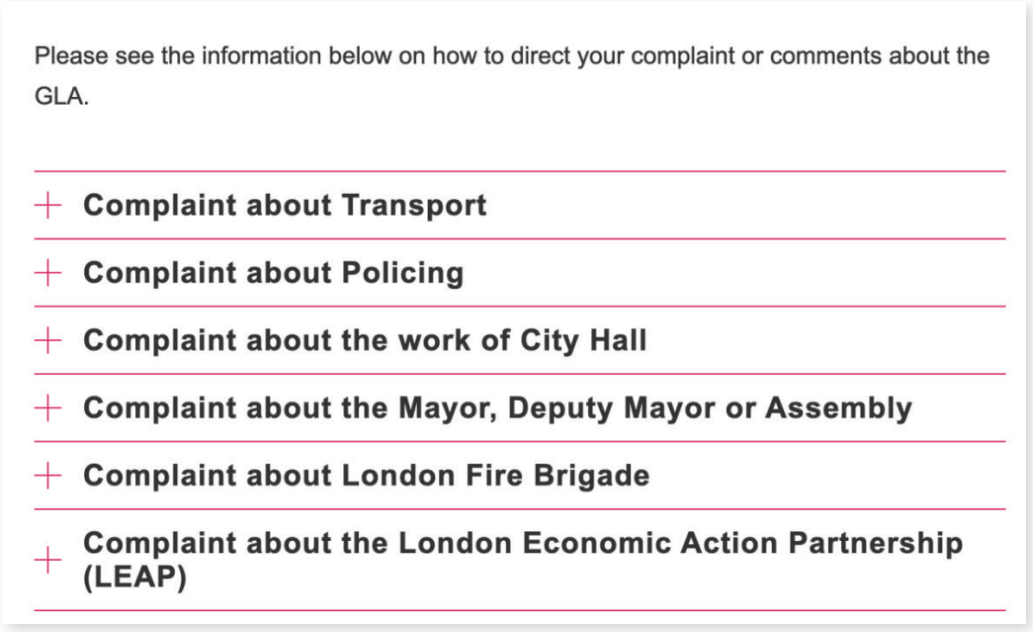


Figure 5-17: GLA platform's complaint channel

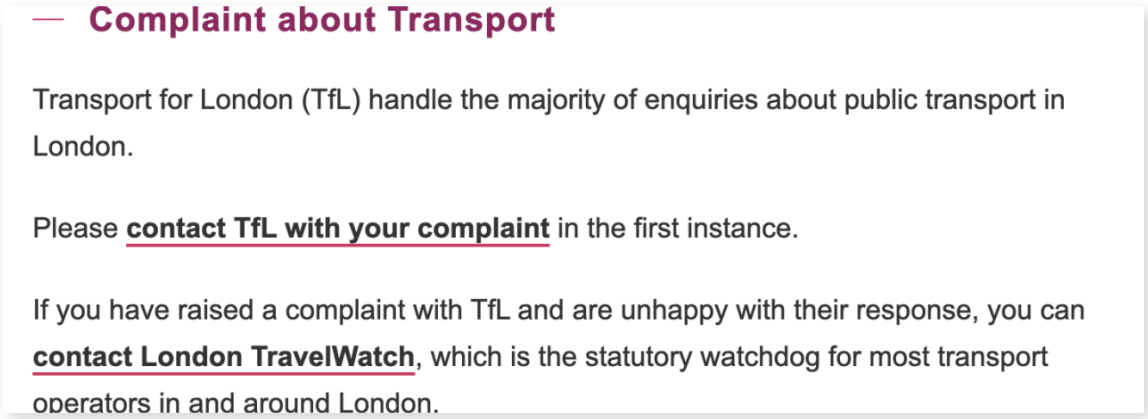


Figure 5-18: GLA platform with both complaint and oversight channels

The platform also offers citizens a channel to oversee the handling of complaints. If citizens are unhappy with the response to a complaint, they can use this channel to find the relevant oversight agency and provide feedback. This one-stop platform greatly reduces the cost and difficulty of lodging complaints, and boosts the overall satisfaction with complaint resolution.

(2) Clear Complaint Procedures for Each Stage

When citizens click on the relevant complaint section on the GLA platform, they are provided with detailed guidance on the complaint procedures, which clearly outlines the feedback citizens will receive at each stage. Taking complaints about the work of the City Hall as an example, the GLA implements a transparent two-stage complaint policy. Complaints are to be acknowledged within five days and responded to within 20 days.

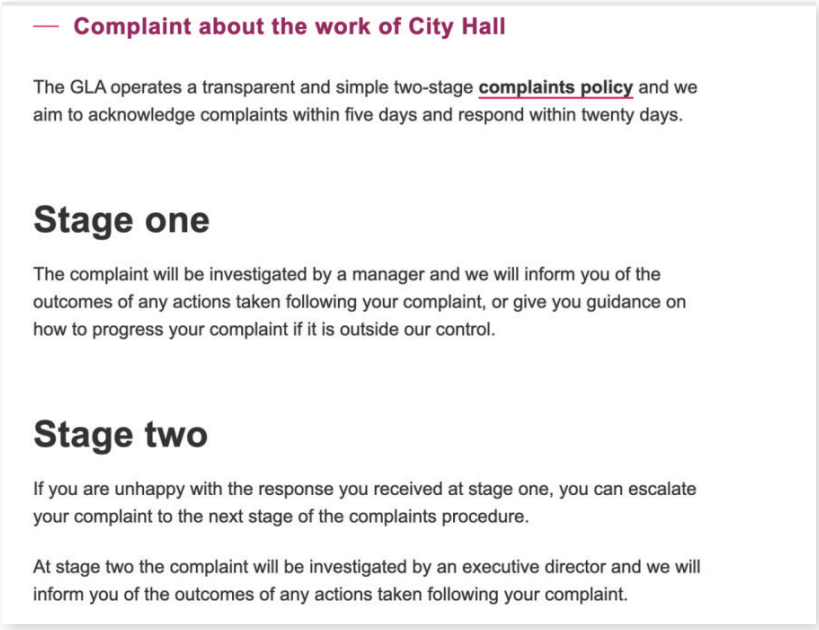


Figure 5-19: Two-stage complaints policy concerning the work of City Hall

In the first stage, complaints are investigated by managers. The government informs those who filed the complaints of the actions being taken and ensures that the processing agency responds in a timely manner. If a complaint falls outside the scope of the city government's responsibilities, the platform provides guidance on how to further pursue the complaint.

If citizens are dissatisfied with the outcome of the first stage, they can escalate the complaint to the second stage. At this stage, the complaints are investigated by executive directors, and the city government will inform those who filed the complaints of the next steps, providing a pathway for overseeing the complaint resolution. If the resolution is still unsatisfactory, citizens can contact the local government or social care representatives via online channels or by phone.

In addition, the GLA platform provides citizens with the contact details and work emails of the relevant officials responsible for each topic, enabling direct communication for raising concerns or asking questions. This further reduces the inefficiency and administrative waste of classifying and distributing complaints within government departments. Citizens can expect quicker, more specific and more professional responses, and their constructive suggestions are more likely to be effectively implemented in urban development, improving the quality and efficiency of government-citizen interaction.

(3) Open Sharing of Information

The GLA advocates for the open sharing of information. When handling requests for information disclosure, citizens are reminded to confirm the necessity of their requests to reasonably allocate limited resources. Citizens' complaint feedback also becomes part of the data on the platform, and the GLA publicly discloses how citizens' complaints are processed. If citizens prefer their data not to be shared publicly, they can specify this when providing feedback. Citizens can participate in discussions on key topics via the "Talk London" platform to offer suggestions for the city government's future plans and policies. This enhances citizens' sense of involvement and their influence on policies, and contributes to the efficient operation of the government.

■ Valuable Experience

The GLA platform centers on the entire process of handling citizens' complaints, integrates complaint and oversight channels, and optimizes resource allocation by directing complaints to different departments. Through the establishment of an effective and phased complaint process, it ensures that citizens' complaints are taken seriously and resolved efficiently. The commitment to acknowledging complaints within five days and responding within 20 days highlights the city's focus on rapid responses to complaints and a constant pursuit of service quality. Introducing independent third-party services such as social care workers, promoting the open sharing of information, and hosting open discussions of important issues all help enhance the fairness and transparency of government work. Such an approach fosters a positive ecosystem of government-citizen interaction and promotes the mutual development and prosperity of the government and citizens.

8 Madrid 010 Hotline: Improving Citizens' Satisfaction Through Service Standardization and Quality Management

Case Overview

The Madrid 010 hotline is a multi-channel, wide-ranging and multilingual public service platform provided by the Madrid City Council. By continuously expanding service channels and fostering integrated development, the Madrid 010 hotline has effectively enhanced service quality and the public service experience. Through the implementation of a series of regulations and standards and the introduction of a quality management system, the hotline ensures that citizens' complaints receive timely responses, promotes continuous improvements in service quality and efficiency, and thus increases citizens' satisfaction with the service.

(1) Diversified Service Channels

The Madrid 010 hotline offers a variety of offline and online service channels, including telephone, website, social media, text messaging, video and voice, which not only improve the accessibility of municipal services but also significantly raise the response speed of municipal services.

Through the hotline, citizens can access a wide range of municipal information, such as public administration, trade and consumer affairs, sports, personal documents, education, finance and economics. Additionally, the hotline provides personalized procedures and services for specific phone inquiries, covering a broad spectrum of municipal matters, including administrative affairs, culture, education, transportation, housing, employment and other areas.

(2) Open Data Application

The Madrid 010 hotline utilizes the municipal open data portal to provide detailed hotline service data, thus promoting data utilization, increasing public service transparency and encouraging citizen participation in service improvement. Through the open data portal, citizens can access and download various statistics, including call volume, response time, handling status and citizens' satisfaction ratings. The reuse of these data sets not only helps citizens understand the hotline's operational status but also provides researchers and developers with tools for data analysis, application development and the designing of innovative services.

Open data facilitates the optimization of municipal services by identifying citizens' top concerns and high-demand scenarios, and enables the city government to allocate resources more effectively and improve response efficiency. The data also supports demand forecasting and problem warning, helping the government develop proactive measures to improve service quality and citizen satisfaction. Furthermore, the transparency of open data improves a policy feedback mechanism, where citizens can provide suggestions while browsing the hotline data, offering a basis for the government to accurately improve service quality.

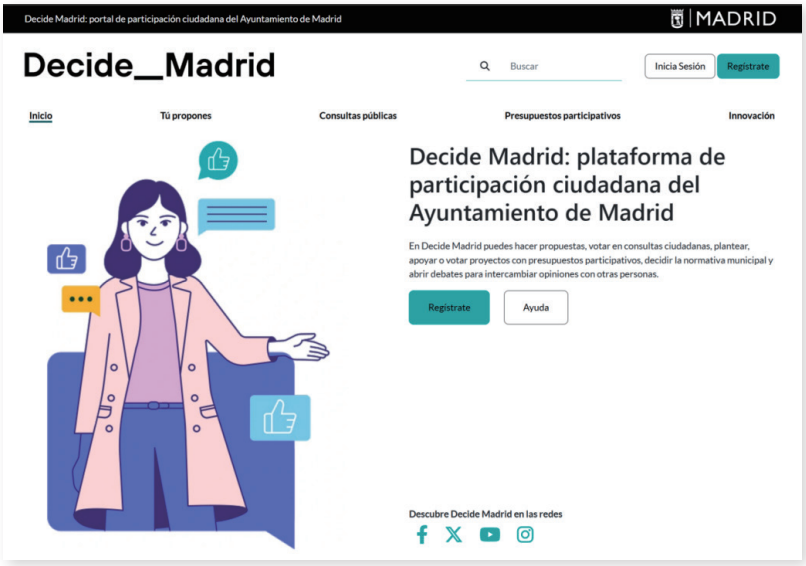


Figure 5-20: Website interface of Decide Madrid

The Madrid 010 hotline also collects feedback data through online platforms like Decide Madrid and social media, and analyzes public opinion trends and public satisfaction with government services. It enables the government to identify and prioritize pressing concerns of the public to guide policy development and service improvement. Suggestions on the hotline and data on public complaints are systematically managed, and targeted responses are made within 30 days to promote effective public participation and transparent governance.

Qué COMPROMISOS de calidad asumimos:

1. Ofrecemos un **servicio ágil, rápido y eficaz**. Se reciben al menos el 80% del número total de intentos de llamada.
2. **Atendemos** al menos el 80% de las **llamadas recibidas**.
3. Al menos el 80 % de las personas estarán **satisfechas** con el **tiempo de espera** en ser atendidos.
4. En aquellos casos en los que **no se pueda proporcionar la información solicitada inmediatamente**, ésta se facilitará respondiendo por correo electrónico, o telefónicamente si lo elige la ciudadanía, en el 90% de los casos, en un plazo inferior a 3 días hábiles y nunca superior a 7 días hábiles.
5. Utilizamos un **lenguaje claro y comprensible** y proporcionamos un **trato amable y cortés**. El 90% de las personas usuarias estarán satisfechas o muy satisfechas con el trato recibido y el lenguaje empleado. La valoración dada al trato recibido y al lenguaje empleado será igual o superior a 7, en una escala de 0 a 10.
6. Contamos con un **personal altamente cualificado y profesional**. Los agentes reciben una formación inicial de 100 horas y al menos 20 horas anuales de formación continua. Se realizan auditorias cuatrimestrales para evaluar la idoneidad de su atención; el 90 % de las respuestas serán positivas y/o mejorables.
7. Prestamos un **servicio de calidad**: la **valoración de las personas usuarias** al Teléfono 010 Línea Madrid será igual o superior a 8, en una escala de 0 a 10 y más del 90% de las personas usuarias estarán satisfechas o muy satisfechas con el servicio recibido, con su utilidad y con la cualificación y profesionalidad de los agentes.
8. Contestamos al menos, el 90% de las **sugerencias, reclamaciones y felicitaciones** en un plazo máximo de 30 días naturales desde su presentación y en ningún caso en un plazo superior a 2 meses.

Medimos el grado de cumplimiento de nuestros compromisos de calidad y los publicamos anualmente.

Figure 5-21: Service regulations of the Madrid 010 hotline

(3) Standardized Service Regulations

The Madrid 010 hotline has established a series of service regulations to ensure service quality. In providing services, the call answering rate and the citizens' satisfaction rate concerning wait time must be at least 80%. If immediate feedback is not possible, 90% of requests must be responded to within three workdays via email or phone. At least 90% of suggestions and complaints must be replied to within 30 days, and no complaint should go unanswered for more than two months. Calls must be answered with clear, understandable language and a polite attitude, and the rate of citizens' satisfaction or high satisfaction with the hotline service, language use, practicality and the qualification and professionalism of the operators should reach 90%.

In terms of training and evaluation, operators must receive no less than 100 hours of initial training and at least 20 hours of advanced training each year. Evaluations are held quarterly to assess the operators' services, and 90% of the evaluation scores are required to be at a satisfactory or improvable level. These standardized service regulations not only ensure that citizens receive timely and accurate help but also enhance the citizen's recognition of government services.

(4) Systematic Quality Management

To better assess the operation of the Madrid 010 hotline, the Madrid City Council has introduced a quality management system to evaluate the hotline's services. The charter for quality assurance and evaluation describes the city's quality management plan in three action guidelines: self-assessment, improvement plans, and certification and accreditation.

Among the three guidelines, self-assessment and improvement plans are mandatory and must be implemented based on specific circumstances, while certification and accreditation are non-mandatory. The introduction of the quality management system is a key method for developing service standards and helps the 010 hotline promote continuous service improvement and enhance citizen satisfaction.

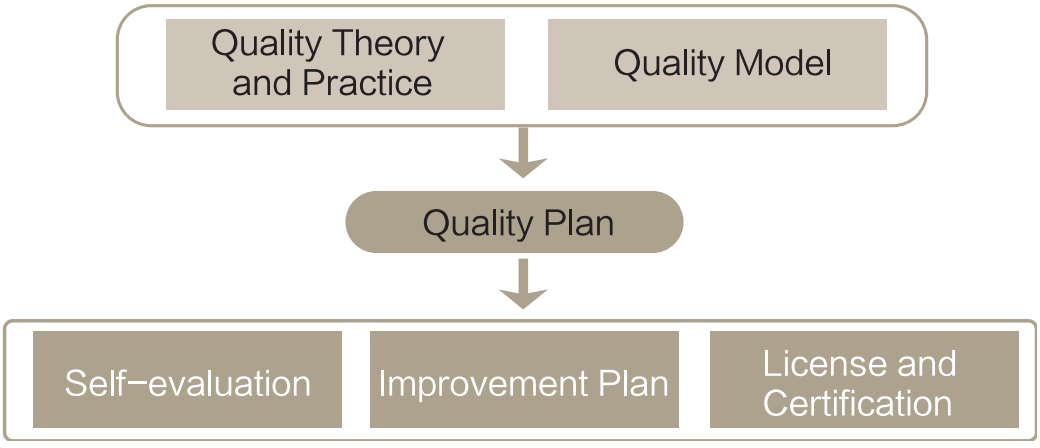


Figure 5-22: Action plan

Valuable Experience

The Madrid 010 hotline has developed strict service standards and a quality management system. Through systematic evaluation and certification processes, it guarantees the continuous improvement of service quality and efficiency and ensures the standardization and professionalism of services. This, in turn, increases citizen satisfaction and offers valuable experience in standardizing management and building service evaluation systems for global city hotlines.

Utilizing the municipal open data portal, online platforms and social media for open data application, the Madrid 010 hotline has created an interactive model that effectively uses citizens' feedback to enhance communication between the government and the public. This effort further boosts citizen participation and facilitates effective communication, providing valuable insights for building a more efficient and responsive city hotline platform.

9 Nanjing 12345 Hotline: Promoting Refined Urban Governance Based on Hotline Data

Case Overview

The Nanjing 12345 hotline leverages data analysis to make efforts in three aspects of urban governance — utilizing digital technology to respond quickly to citizens' complaints, employing intelligent solutions to enhance basic public service capabilities, and promoting urban development and innovation through fine-grained governance. At the same time, during the implementation of fine-grained urban construction projects, Nanjing places great emphasis on data feedback, and strengthens the tracking and evaluation of whether complaints have dropped and whether the challenges have been effectively addressed, thus ensuring a closed service loop.

Best Practices

(1) Leveraging Digital Technology to Facilitate Rapid Responses to Citizens' Complaints

To make it easier for citizens to access hotline services, the Nanjing 12345 hotline has expanded its access channels, including an app, an official WeChat account and a website. This expansion has effectively eased the pressure on hotline traffic, with online channel requests increasing from 10% to 25%. The hotline has continuously improved its ability to handle and respond to requests through the internet, creating an "AI + human" rapid response system that adds online service personnel to

Figure 5-23: Special section of Qinqing Yiqilai

its text-based robot platform, providing more personalized and accurate services. It has established a rapid response mechanism for providing information, submitting complaints and directing them to the appropriate departments, thereby further improving communication between citizens and governmental agencies.

In terms of serving businesses, the hotline offers a professional green channel through its special line, Qinqing Yiqilai, to help ease the burden on companies. It also strengthens policy notifications and conducts activities like having policy specialists visit business parks, all aimed at optimizing the business environment.

The Nanjing 12345 hotline has also developed a comprehensive hotline data platform that combines data collection, search, analysis, integration and visualization. This platform strives to provide real-time statistics and enhance visualization. The hotline continues to expand its application of intelligent technologies, adding features such as smart voice- and text-based services, smart quality control, smart training, and a data center. It has also upgraded smart task assignment, intelligent follow-up calls and smart assistants, and set up training and supervision platforms, resulting in a full-process application of intelligent technologies. The accuracy of intelligent task assignment has increased from 90% to about 95%, and the recognition accuracy for outbound calls has risen from 85% to approximately 90%, providing strong support for a faster response to citizens' complaints.

(2) Utilizing Intelligent Solutions to Improve Basic Public Service Capacity

Leveraging advanced technologies such as AI, big data and cloud computing, the hotline has developed a multidimensional decision analysis platform. In collaboration with the Doctoral Research Station for Digital Citizen Services, the hotline deeply analyzes citizen concerns, focusing on 133 key issues related to the immediate interests of citizens, such as property management, parking management, internet finance and consumer rights protection. The platform thoroughly explores

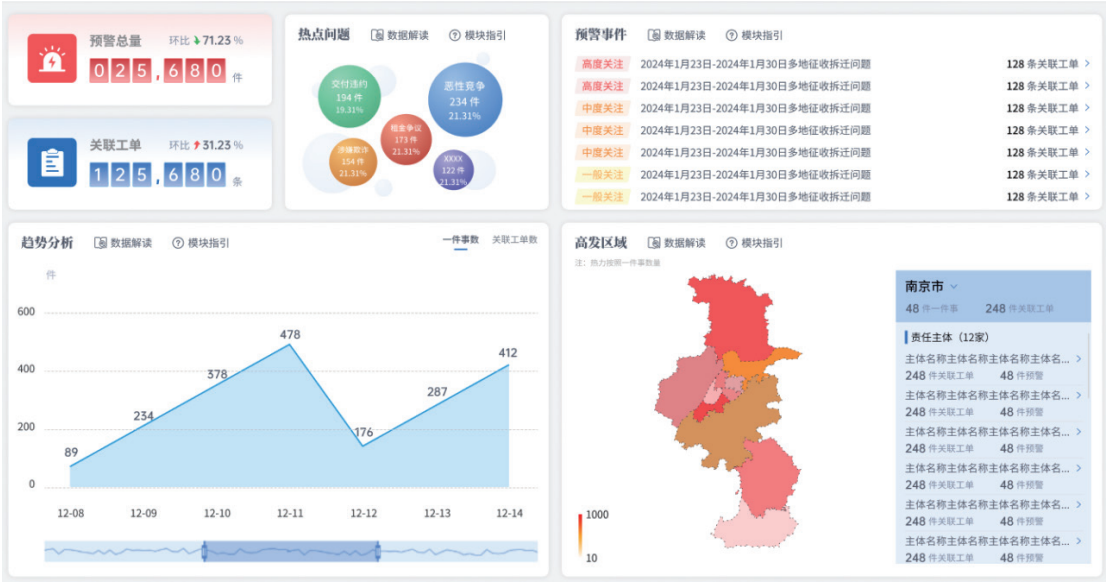


Figure 5-24: Screenshot of the data analysis platform

major public complaints and suggestions, which serve as important support and guidance for identifying problems and facilitating urban planning. Regularly, the hotline provides special analysis reports to relevant government departments, converting hotline data into policy recommendations.

For example, in the field of public transportation, the Nanjing 12345 hotline analyzed the changes in citizen complaints about public bicycles, private cars and subways. In response to the decrease in attention to public bicycles and the increased focus on subways and ride-hailing, the hotline proposed the concept of "elastic public service supply." This means that the provision of public services should be dynamically adjusted according to the changes in citizens' transportation needs. In the "14th Five-Year Plan for Guaranteeing and Enhancing Public Services of Nanjing," the concept of smooth travel was incorporated into the public service system, aiming to strive for higher-quality services while ensuring basic public services.

(3) Promoting Urban Development and Innovation to Achieve Refined Governance

A key issue in urban governance is the mismatch between the supply of public services and infrastructure and the actual demand of citizens. To improve fine-grained urban development, the Nanjing 12345 hotline collaborates with relevant departments to address the supply-demand contradictions in urban construction projects, thereby enhancing citizens' life quality and sense of fulfillment. The hotline explores ways to integrate top-down planning with bottom-up demand feedback and focuses on bridging gaps in urban management to improve governance capacity and raise public satisfaction.

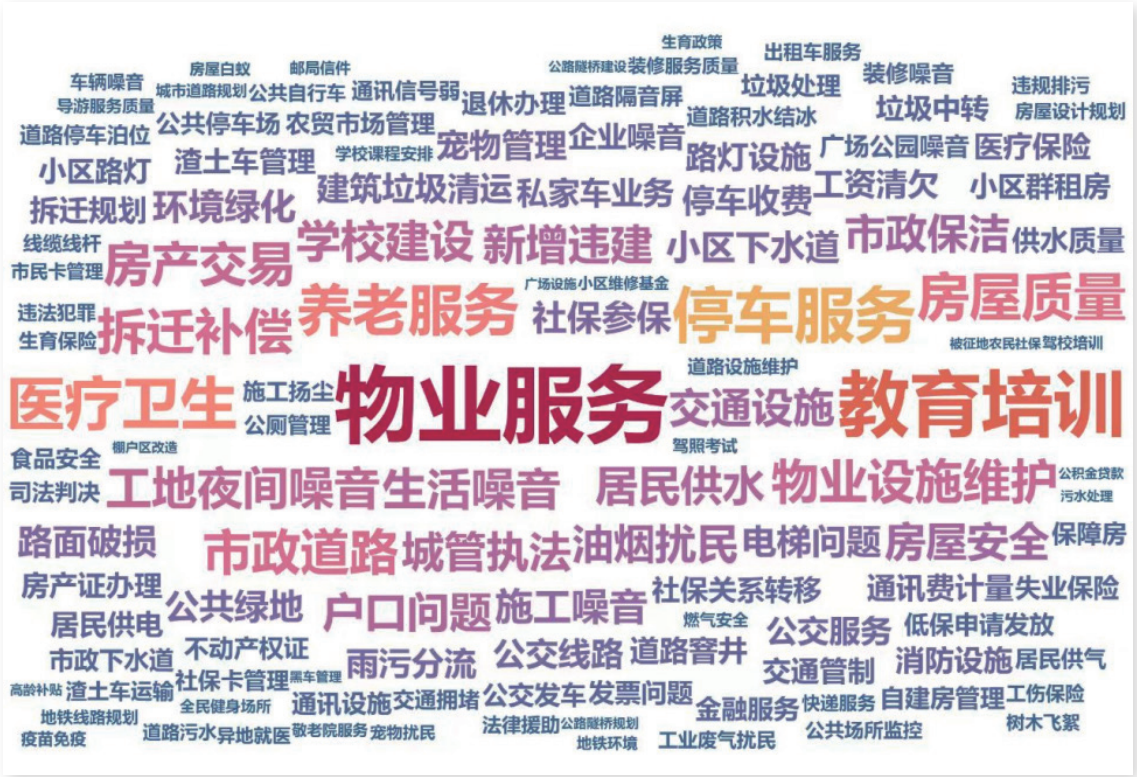


Figure 5-25: Frequency cloud of complaints filed with the Nanjing 12345 hotline

To better understand citizens' needs for urban construction management, Nanjing uses the 12345 hotline to gather data. Key issues in six major areas —traffic infrastructure, ecological protection, municipal utilities, urban renewal, housing security and urban management — are analyzed comprehensively. The hotline identifies regional features, shifts in citizens' needs and evolving trends, thus providing decision-making support on mulling new projects and making annual plans.

Valuable Experience

Based on hotline data while respecting public opinion in responding to complaints, the Nanjing 12345 hotline targets the most immediate and urgent needs of citizens, improves basic public service capabilities and promotes innovative urban construction. On one hand, the hotline adheres to collaborative governance, coordinating the efforts of multiple departments to break down functional barriers and eliminate blind spots in responsibilities. This effort enables the integration of urban construction and management, and helps form systemic and long-term solutions.

On the other hand, the hotline emphasizes multi-stakeholder participation in fine-grained governance. Citizens' complaints reported through the hotline serve as the main thread, encouraging the active participation of residents, professional institutions and experts. This broad participation ensures that the overall governance goals are pursued while reasonably addressing individual citizens' concerns, thereby fostering a diverse governance framework where everyone can participate.

10 New York City's NYC311 Hotline: Activating the Value of Hotline Governance Through Data Sharing and Efficient Application

Case Overview

New York City's 311 hotline (NYC311), established in 2003, is a multi-channel, multilingual and year-round non-emergency government service platform. Through inclusive service channels, a transparent and open data platform, intelligent and efficient technological support, and a scientifically designed institutional framework, it has created an efficient, fair, transparent and secure service model. The purpose of the NYC311 hotline is to enhance connectivity, responsibility and transparency: connecting the public with the government, increasing government responsibility, and ensuring the transparency of government operations and responses to public complaints.

A key feature of the NYC311 hotline is its strong emphasis on open data sharing and efficient application. The city has established a comprehensive system for data openness and management, actively encouraging both the government and various social entities to jointly explore the governance

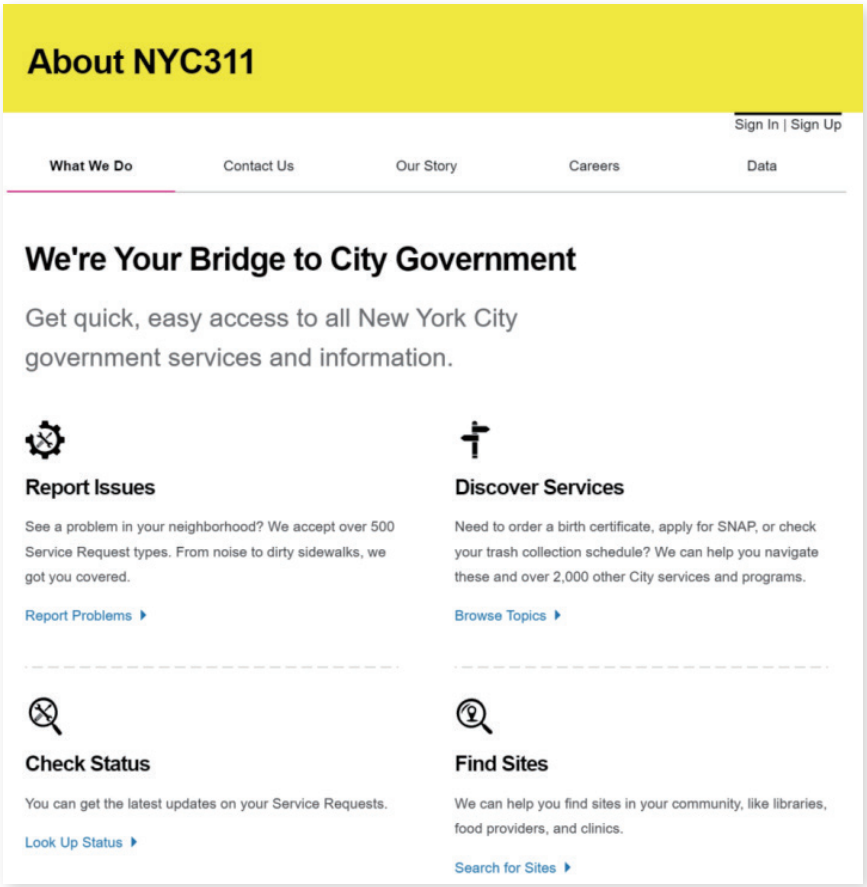


Figure 5-26: Services of the NYC311 hotline platform

value of the hotline. This endeavor not only provides strong data support and decision-making references in promoting innovative urban governance but also fosters broad citizen participation, offering valuable lessons for the development of other city hotlines and data governance practices.

■ Best Practices

(1) Efficient and Standardized Data Governance

The NYC311 hotline has constantly strengthened its data standards, quality, security and oversight to ensure effective data governance.

In terms of data standards and quality assurance, New York City has established a robust data standards system that emphasizes life cycle management to ensure data quality. The city's Open Data Law, passed in 2012, includes an annual compliance review system for open data and requires New York City's open data platform to improve metadata, documentation and the training standards for open data coordinators annually to continuously improve the compliance and quality of open data. The law mandates that each government agency appoint an open data coordinator responsible for determining which agency data sets should be made publicly available. Based on the type, scale and update frequency of the data, these coordinators regularly update and supplement data sets on the open data platform to ensure data accuracy, continuity and completeness.

For data security, New York City has initiated the Citywide Data Integration Agreement (CDIA), which requires all government agencies in the city to participate under the leadership of the city's Chief Privacy Officer and the Mayor's Office of Information Privacy. The agreement outlines clear

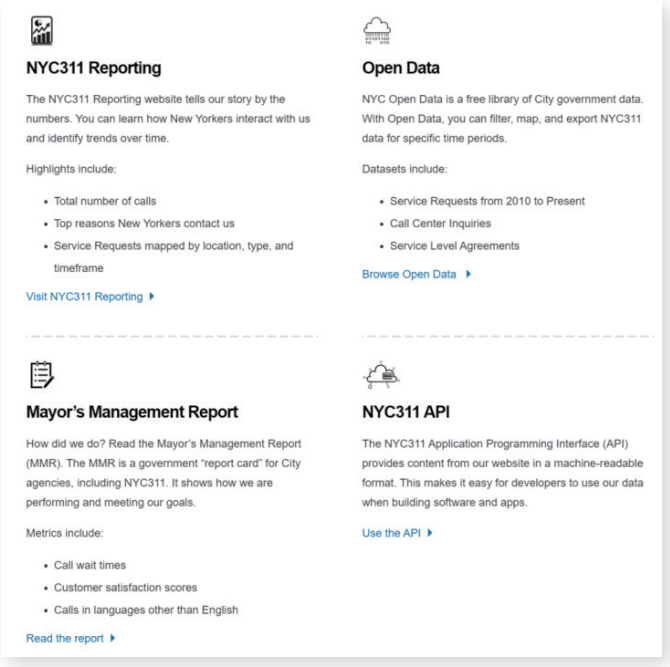


Figure 5-27: NYC311 hotline open data platform

regulations for data sharing, privacy protection and data security, and fosters a strict mechanism for data security and privacy protection. It requires that data must be anonymized before public release and standardizes data request procedures to ensure the legitimate use of data while protecting citizens' privacy.

Regarding oversight, the NYC311 hotline integrates data openness with performance evaluation and supervision. It regularly reports monthly statistics to the New York City Council, and strengthens the oversight of hotline services. In addition, the hotline assesses data openness and related reports and provides feedback to push government departments to continuously improve public service offerings.

(2) Public-Facing Data Openness

The NYC311 hotline has accumulated extensive data on public complaints, urban issues and service responses. After anonymizing the hotline data, the information is linked to the city's open data platform, where it can be accessed via the official website for open sharing.

The hotline shares data in various forms, including government administration reports, publicly available hotline service data and application programming interfaces (APIs). The public can screen, match and export data on specific topics or within certain time frames according to their needs. The hotline also visualizes service information on maps, making it easier for the public to understand the overall service situation.

By offering a diverse range of data in various forms, the public can gain a more comprehensive understanding of the city's governance status, while professionals can conveniently use the hotline data through APIs to further promote data application and optimize urban governance.

(3) Collaboration of Multiple Stakeholders for Collaborative Governance

Agencies in charge of the NYC311 hotline regularly analyze and summarize historical data to forecast trends in recurring issues to provide forward-looking support for urban management decision-making. For example, the New York City Council's data team uses hotline data to quantify voter complaints and track the locations and the resolution progress. In February 2019, this team analyzed complaints about the misuse of parking signs and proposed a new bill to increase enforcement in areas with frequent violations, thus optimizing government services and improving law enforcement efficiency. Similarly, the related agency adjusted the issuance of liquor licenses based on noise complaint data from the hotline.

The NYC311 hotline also shares the data with other departments and organizations and encourages third-party institutions and social forces to participate in data analysis and application, fostering multi-stakeholder collaboration for collaborative governance. This effort has driven innovation and development in urban governance. For instance, RentHop, a rental search engine, uses open data to create a visual map of heating-related complaints in New York City, helping renters choose suitable neighborhoods and improving the quality of life for residents. Furthermore, the City University of New York's Center for Urban Science and Progress initiated a comprehensive study using

open data that realized noise monitoring and analysis employing machine learning, the Internet of Things and data mining technologies, thereby contributing to mitigating urban noise pollution.

In addition, the data from NYC311 provides researchers with a wealth of resources, fostering theoretical innovation and enriching the academic understanding of individual behavior and urban governance. For example, research based on data has provided valuable insights into smart city development and citizen engagement. Scholars have also focused on ensuring data quality and classification management, privacy protection and data security, offering practical solutions for building transparent, open and secure data platforms. A proposed OpenComm data framework seeks to address data fragmentation and privacy security issues by automating data recovery, integration, classification and visualization processes. These research innovations have provided a solid theoretical foundation for strengthening urban governance and further promoting the development of innovative urban governance practices.

■ Valuable Experience

Adding value to urban governance through data sharing and efficient application is a salient hallmark of the NYC311 hotline. On one hand, by making hotline data transparent and open, the public and social organizations can gain a more direct understanding of the current state and challenges of urban governance. They can also offer opinions and suggestions through the NYC311 platform to actively participate in the urban governance decision-making process, which strengthens the public's sense of belonging and responsibility and facilitates collaborative production and value creation between the government and multiple stakeholders in urban governance. On the other hand, urban management departments can tap into the value of hotline data to ensure more targeted and scientific public decision-making, thus advancing urban governance innovation and practical explorations. Through multi-level analysis of hotline data, the government can gain a comprehensive understanding of the city's overall operations, identify key issues in urban governance, and get crucial support for decision-making and policy formulation. This not only helps optimize resource allocation and improve service strategies, but also increases policy relevance and effectiveness and enhances the capacity and quality of public services.

11 Paris 3975 Hotline: Promoting the Sustainable Use of Data Through Legislation

Case Overview

The Paris 3975 hotline opens multiple channels and integrates both phone and email channels to offer citizens convenient access to services, catering to different communication preferences. The integration improves the efficiency of information transmission and enhances the flexibility and efficiency of citizens' filing of complaints and the hotline staff's resolution efforts. The hotline also shares a wide range of detailed, transparent and high-quality data in various formats to provide a vast space for exploring data application.

Best Practices

(1) Providing Diverse Solutions for Addressing Citizens' Complaints

The Paris 3975 hotline covers a wide range of services, providing timely and effective assistance with everything from identity card and passport applications to parking problems and family-related matters. While striving for comprehensive service coverage, the hotline places greater emphasis on accessibility and inclusiveness. For individuals with hearing impairments and other special groups, the hotline offers multimedia solutions via tablets, smartphones and computers. Its solutions include instant transcription and video-to-French sign language interpretation, enabling both remote and real-time communication. Together, these measures create a system of diverse and accessible services.

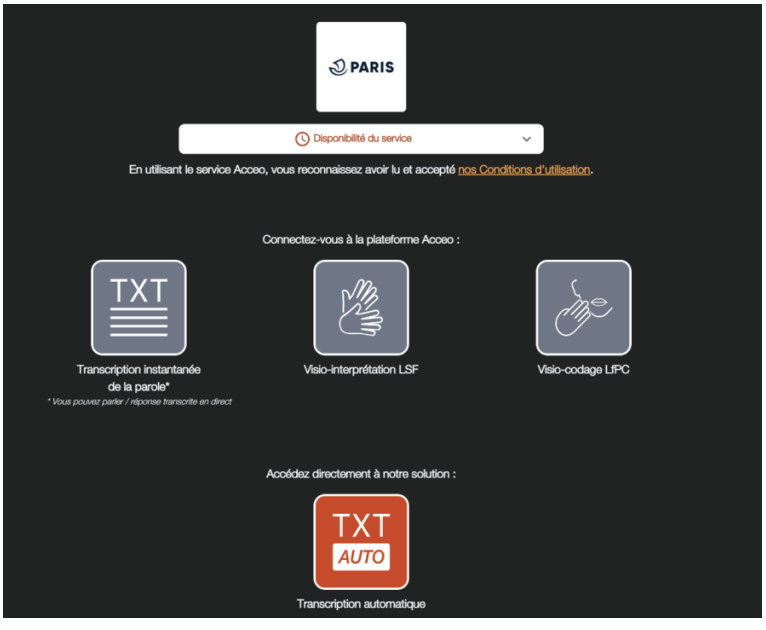


Figure 5-28: Accessible communication modes provided by the Paris 3975 hotline for special groups

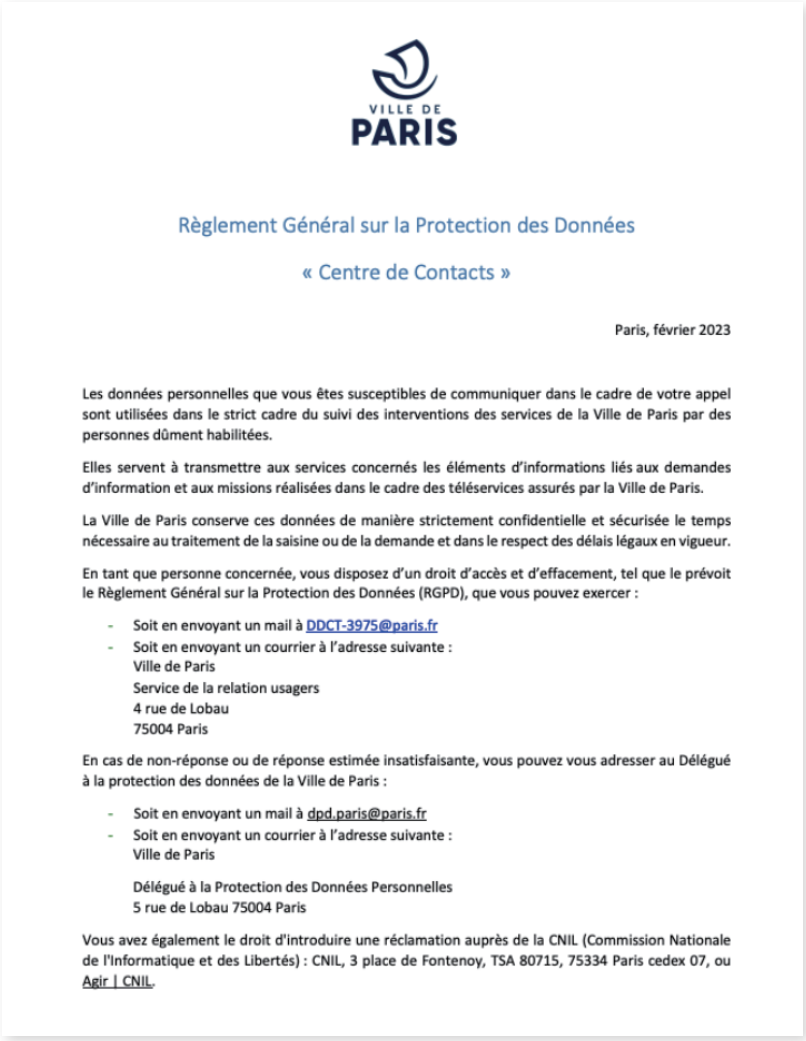
(2) Empowering Emergency Management to Help People in Need

The Paris 3975 hotline goes beyond addressing citizens' basic needs by focusing on helping residents navigate special challenges during emergencies. By optimizing its processes, the hotline ensures timely and accurate services. During extreme weather or unexpected crises, the hotline leverages the Reflex system to connect with vulnerable groups such as elderly individuals living alone or those with physical or mental disabilities. This approach ensures they can be promptly relocated to safe care facilities when necessary. By swiftly responding to citizens' needs in emergencies, the hotline has become a crucial component of the city's emergency management system, making significant contributions to building a more harmonious and inclusive urban environment.

Figure 5-29: Personalized support for vulnerable groups provided by the Paris 3975 hotline through the Reflex system

(3) Addressing Privacy Risks and Ensuring Data Security

The Paris 3975 hotline has always underlined the protection of data privacy and security in handling data related to the public. It requires anonymization before data is made public and setting clear procedures for data requests to ensure the legitimate use of data. In accordance with the General Data Protection Regulation, the Paris municipal government mandates how the information provided by citizens to the hotline can be used. This rigorous data management approach not only protects the rights of data providers and users but also provides a solid legal foundation for open data sharing and promotes sustainable data use. In this way, the hotline ensures the quality and credibility of its data, thus providing reliable support for urban governance.



VILLE DE PARIS

Règlement Général sur la Protection des Données

« Centre de Contacts »

Paris, février 2023

Les données personnelles que vous êtes susceptibles de communiquer dans le cadre de votre appel sont utilisées dans le strict cadre du suivi des interventions des services de la Ville de Paris par des personnes dûment habilitées.

Elles servent à transmettre aux services concernés les éléments d'informations liés aux demandes d'information et aux missions réalisées dans le cadre des téléservices assurés par la Ville de Paris.

La Ville de Paris conserve ces données de manière strictement confidentielle et sécurisée le temps nécessaire au traitement de la saisine ou de la demande et dans le respect des délais légaux en vigueur.

En tant que personne concernée, vous disposez d'un droit d'accès et d'effacement, tel que le prévoit le Règlement Général sur la Protection des Données (RGPD), que vous pouvez exercer :

- Soit en envoyant un mail à DDCT-3975@paris.fr
- Soit en envoyant un courrier à l'adresse suivante :
  Ville de Paris
  Service de la relation usagers
  4 rue de Lobau
  75004 Paris

En cas de non-réponse ou de réponse estimée insatisfaisante, vous pouvez vous adresser au Délégué à la protection des données de la Ville de Paris :

- Soit en envoyant un mail à dpd.paris@paris.fr
- Soit en envoyant un courrier à l'adresse suivante :
  Ville de Paris

  Délégué à la Protection des Données Personnelles
  5 rue de Lobau 75004 Paris

Vous avez également le droit d'introduire une réclamation auprès de la CNIL (Commission Nationale de l'Informatique et des Libertés) : CNIL, 3 place de Fontenoy, TSA 80715, 75334 Paris cedex 07, ou Agir | CNIL.

Figure 5-30: General Data Protection Regulation of Paris

Valuable Experience

The Paris 3975 hotline offers a diverse range of service channels and solutions to meet the varied needs of its citizens. It caters not only to the everyday service requirements of the general public but also provides dedicated channels for individuals with disabilities, ensuring that every resident can access convenient, efficient and thoughtful services. In emergencies, the hotline swiftly addresses citizens' concerns by working closely with emergency management agencies, public service institutions and other agencies, forming a robust coordination mechanism to enhance the city's ability to respond to crises effectively. When disclosing data involving personal information, the hotline strictly adheres to data protection regulations, ensuring both the security and legality of the information. Through these measures, the hotline improves the quality and efficiency of its services, safeguards citizens' legal rights and interests, and fosters greater trust and satisfaction in public services.

12 Rio de Janeiro 1746 Hotline: Boosting Government Credibility Through Full-Process Transparent Management

Case Overview

Full-process transparent management is a salient feature of the Rio de Janeiro 1746 hotline. By providing open and transparent hotline data, it creates a clear and traceable service process. This approach combines full-process transparent management with performance management, increasing citizen satisfaction and government credibility. It also encourages active participation from diverse stakeholders in urban governance. The hotline plays a crucial role in facilitating efficient communication between the government and citizens, improves public service quality, and offers valuable experience for other cities seeking to implement transparent management and governance.

Figure 5-31: Promotional image for the Rio 1746 hotline's mobile app

Best Practices

(1) Providing Transparent and Open Public Data

The Rio 1746 hotline ensures citizens' right to know by offering open data. On its website, the city government displays various types of information, including the total number of requests received throughout the year, the most frequently requested services, demand by region, demand fulfillment rates and citizen satisfaction survey results. The website also features data visualization tools to allow citizens to view service data through charts and maps. This endeavor increases government service transparency and provides citizens with a better understanding of municipal services.

Figure 5-32: Information access section of the Rio 1746 hotline

In addition, the Rio 1746 hotline has a dedicated information access section. Through the portal, all citizens of Rio, and even non-residents, can request access to public information produced or stored by Rio's municipal agencies and directly or indirectly managed organizations.

From the transparent and open hotline data, the public and social organizations can gain a clearer understanding of the city's governance status and challenges. They can also provide feedback and suggestions through the hotline platform to take an active part in the urban governance decision-making process. This fosters a sense of belonging and responsibility among citizens and facilitates collaborative production and joint value creation in urban governance. Data shows that in 2023, Rio citizens submitted over 10,000 improvement suggestions through feedback channels, and over 80% of them were adopted and implemented. This systemic feedback mechanism ensures that citizens' voices are promptly heard and translated into concrete improvements.

(2) Creating a Clear and Traceable Service Process

The Rio 1746 hotline adheres to the principle of full-process transparent management and strives to provide citizens with a clear, traceable service process that keeps them informed about the handling of their requests in real time. In 2018, the Rio city government launched a new version of the Rio 1746 hotline's web portal, which includes more than 500 services and over 1,000 pieces of information. The portal not only allows citizens to submit requests online but also provides detailed information about required documents, processing time and service steps, ensuring that citizens understand the entire process before applying. Through automated notifications, citizens receive real-time updates via short messages or emails regarding the handling of their requests. After completion, citizens can evaluate the quality of the service. If they are dissatisfied with the outcome, they can contact the municipal

oversight department via the website's feedback mechanism, further enhancing service transparency and efficiency. According to statistics, citizen satisfaction with public services reached over 90% in 2023, and the timely progress tracking and feedback received widespread praise.

(3) Promoting Data-Based Performance Management

The Rio 1746 hotline combines full-process transparent management with performance management. It has established a data-driven service improvement mechanism that promotes the optimization of service processes and efficiency.

On one hand, by setting clear service deadlines and quality standards, and tracking and analyzing data, government departments can monitor their performance in real time and continuously improve based on citizens' feedback. For example, different types of requests have predetermined processing time periods. Urgent issues, such as traffic accidents or public safety threats, are typically resolved within 24 hours, while routine issues are processed within an average of three to seven days. Requests not handled within the set time frame automatically trigger follow-up procedures.

On the other hand, to ensure constant service quality improvement, the Rio 1746 hotline uses big data to monitor and evaluate the performance of each service step, driving the betterment of service processes. The hotline analyzes key metrics such as call connection rates, service processing time and problem-solving efficiency in real time. By continuously monitoring and analyzing these performance indicators, the city government can adjust service strategies promptly, ensuring more accurate and effective implementation of policies.

■ Valuable Experience

The Rio 1746 hotline's full-process transparent management approach has two main benefits. First, by opening hotline service data to the public, it promotes government information transparency and greatly enhances citizens' trust and satisfaction. Second, it allows the city government to monitor the progress of each service request in real time and comprehensively manage data on service requests. This enables government agencies to respond quickly based on the priority and urgency of requests, allocate resources effectively, and make service processes transparent to citizens, thus improving government transparency and credibility. Supported by performance management, the government can scientifically assess each step of the service process. Through this dynamic feedback mechanism, the city government continuously optimizes the level and quality of public services to effectively meet citizens' needs.

13 San Francisco 311 Hotline: Contributing to Collaborative Governance and Promoting Smart Urban Development

Case Overview

The San Francisco 311 hotline places a strong emphasis on communication and collaboration between government departments and the public, building a cooperative mechanism involving various stakeholders and providing valuable experience for the development of smart cities. For the hotline, the establishment of multi-stakeholder collaborative hotline services is a crucial foundation for ensuring service quality. Interdepartmental collaboration strengthens the responsiveness of public hotline services and boosts public satisfaction. Open data sharing is key to realizing the full value of the hotline, while also supporting interdepartmental cooperation.

Best Practices

(1) Channel Collaboration: Expanding Diverse Channels to Enhance Service Experience

The San Francisco 311 hotline integrates phone, website, app, and social media platforms like Facebook through technological integration. By leveraging the unique advantages of different channels, it promotes the collaborative development of a multi-channel system, providing the public with convenient and diverse ways to interact and access services. This approach significantly improves the efficiency and quality of hotline services and fosters greater interaction and trust between the government and the public.

On one hand, these platforms are integrated into the hotline's client relations management system (LAGAN), which not only helps reduce the workload of the hotline and improves response efficiency but also ensures service consistency and timeliness. This integration allows the hotline and relevant departments to track and address public concerns in real time, thus enhancing service efficiency and quality while boosting public satisfaction. On the other hand, the hotline's real-time interaction, combined with self-service features on the website, app and social media channels, effectively meets the needs of different groups, broadening service coverage, reducing the burden on individual channels, and improving user experience.

(2) Interdepartmental Collaboration: Strengthening Cooperation to Ensure Prompt Services

As a hub for internal collaboration, the San Francisco 311 hotline has established close relationships with various government departments, creating a collaborative mechanism by clearly defining rights and responsibilities to ensure service efficiency.

First, the San Francisco 311 hotline has signed formal cooperation agreements with public affairs, transportation, public safety and other departments, specifying each department's duties and modes of collaboration. This ensures efficient communication and coordination between the hotline and these departments. Second, the hotline holds regular coordination meetings with partner departments to stay updated on their work progress, adjust workflows, and ensure information collaboration. In addition to formal meetings, the hotline also maintains good communication with departments via phone or email, proactively reaching out and confirming details when public inquiries or service requests involve uncertain information. Third, collaborative projects or working groups are set up around pressing issues such as noise complaints and homelessness shelters to enhance effective collaboration and solve tough issues.

Additionally, the San Francisco 311 hotline uses LAGAN to process cross-departmental service requests. This ensures accurate data transmission and connectivity between the hotline and over 50 departments, including the San Francisco Police Department, and facilitates the rapid processing and transfer of assignments. It reduces coordination costs and enhances work efficiency.

(3) Data Collaboration: Unlocking Data Value and Optimizing Urban Governance

The data from the San Francisco 311 hotline is shared through an open data platform, with key information such as the type, content, time and location of complaints.

To support policymaking and decision-making, the hotline agency and social organizations

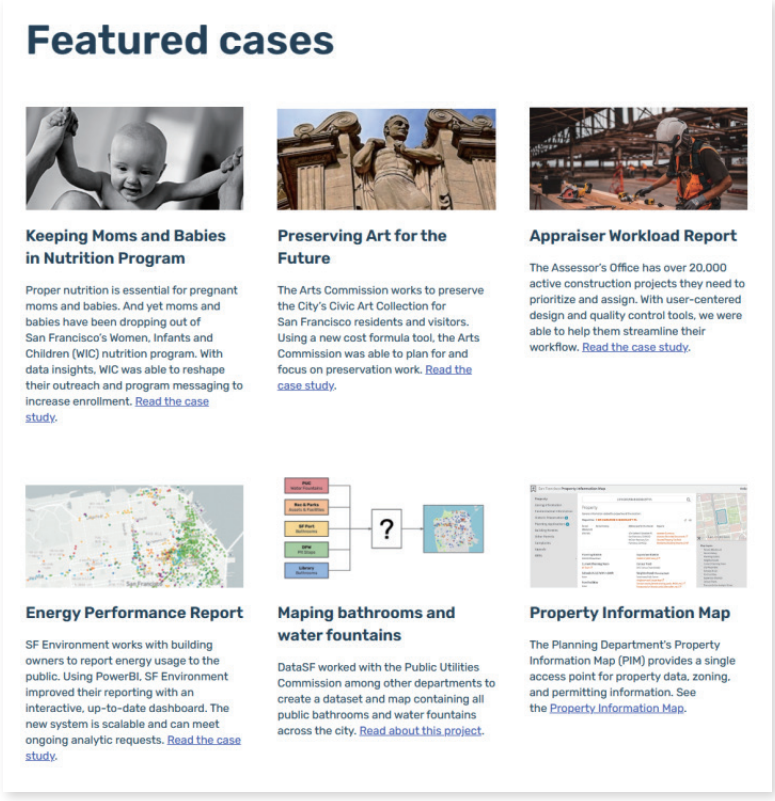


Figure 5-33: Open data sharing and featured cases

analyze the collected data to fully unlock the value of the hotline data to promote more precise and scientific policymaking and decision-making. By tapping the value of open hotline data, relevant departments and social organizations in San Francisco have driven policy innovation in areas such as environmental protection, public facility management, artistic and cultural preservation, and maternal and infant nutrition programs. These efforts have led to a series of innovative solutions and governance models for addressing urban issues. Furthermore, the public can access the shared data to track the status of public service requests at any time, pushing for government transparency and enhancing trust in the government.

(4) Government-Citizen Collaboration: Promoting Public Participation and Improving Service Quality

The San Francisco 311 hotline is not only a service request platform, but also an important channel for public participation in social governance, which encourages active involvement from the public in urban management and service improvement, and provides the government with valuable feedback and suggestions.

San Francisco has established a two-way interaction mechanism between the government and the public. Citizens can easily and quickly access information on urban governance through various hotline service channels and public hotline information platforms, allowing them to express their needs and opinions. This, in turn, drives the government to improve services or formulate relevant policies. For example, research has found that the public can use the hotline to offer views and suggestions on government budget allocation. Public participation not only helps the government better understand the needs and expectations of citizens, allowing for more accurate budget adjustments, but also enhances the transparency and fairness of budget allocation. In the meantime, the public can actively participate in community governance and co-building initiatives through the San Francisco 311 hotline. By submitting suggestions and requests related to community environmental improvements, cultural activities and other areas, citizens promote the government's creation of policies that improve community harmony and enhance residents' sense of happiness.

■ Valuable Experience

San Francisco views the 311 hotline as a key tool in building a smart city, and places high importance on communication and collaboration among the hotline, government departments and the public. It gives play to the collective wisdom of multiple stakeholders to facilitate smart urban development. On one hand, the San Francisco 311 hotline serves as a bridge between the government and the public and enables the government to understand and quickly respond to public demands, thus providing high-quality public services. On the other hand, the hotline acts as a collaborative hub within the government, enhances communication and cooperation among various departments, and improves government operations and service efficiency. Furthermore, by analyzing the data collected through the hotline, policy decisions and urban governance can be better aligned with citizens' needs, leading to optimized resource allocation, improved service processes, and higher service efficiency and quality.

14 Seoul 120 Hotline: Harnessing Diverse Forces to Ensure Efficient Hotline Operations

Case Overview

The Seoul 120 hotline provides 24-hour efficient handling of various consultations and complaints related to daily life, safety and more, and ensures that citizens' needs are addressed promptly. In the construction and operation of the Seoul 120 hotline, resource integration has formed the cornerstone of its efficient operation, while collaborative governance by different parties is key to leveraging its diverse advantages. By integrating consulting services from multiple departments and cooperating with external agencies to create rich service channels, the Seoul 120 hotline offers integrated, professional, convenient and international services, and provides valuable insights for other cities looking to integrate service resources for their hotlines.

Best Practices

(1) Creating Diverse Service Channels

In terms of service channels, the Seoul 120 hotline offers a variety of options to meet the varied needs and situations of different groups. Overall, the channels through which citizens get information from or file complaints with the government can be divided into five main categories. 1. Phones: This channel mainly includes voice consultations and foreign language support. Citizens in Seoul can call the 120 hotline anytime and anywhere to inquire about relevant information. For foreigners, tourists and other visitors, the hotline also offers language interpretation services. 2. Short messages: Citizens can also raise questions or make inquiries via text messages. The system can receive and upload images, making it easier for citizens to ask questions and file complaints while improving information transmission efficiency. 3. Website: This channel includes video chat consultations and

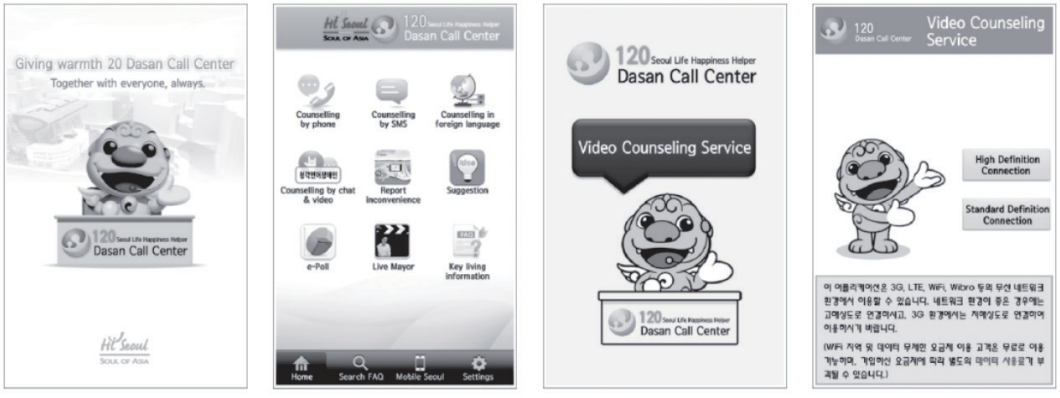


Figure 5-34: Smartphone app interface of the Seoul 120 hotline

information queries. For citizens with hearing or language barriers, the Seoul 120 hotline offers video chat consultations via the website, and the service is also available via the mobile app. Through the website, people can access key information relevant to their daily lives. 4. Social media: The Seoul municipal government and district offices are always ready to respond to citizens' requests via social media. In most cases, inquiries are handled within 24 hours and responded to via social media. 5. Mobile app: This channel allows citizens to make voice calls, send text messages, learn foreign languages and conduct video consultations through a smartphone app. They can also register complaints and read policies.

(2) Integrating Services from Different Departments

The Seoul 120 hotline integrates services provided by multiple departments, offering citizens a unified entry point for varied services and building an efficient, collaborative and unified government hotline platform. The platform integrates 69 government information centers and includes 41 government agencies, including the Seoul Global Center, the emergency medical information center, the Korea Tourism Organization, the immigration service, and the Ministry of Employment and Labor, covering all aspects of citizens' daily lives.

To assist non-Korean-speaking citizens in accessing information, the Seoul government integrated the foreigner telephone consultation service, previously offered by the Seoul Global Center (1688-0120), into the Seoul 120 hotline starting on February 24, 2024, with added services during public holidays and nighttime. For more specialized consultations, citizens can connect to relevant professional agencies, such as the comprehensive service center for foreigners (1345), the tourism

Figure 5-35: Chinese language consultation interface of the Seoul 120 hotline

information center (1330), the emergency center (1339) and the foreign workers assistance center (1644-0644). Such centers provide more professional responses and boost user satisfaction.

Furthermore, to help female immigrants and multicultural families with issues related to life and communication in Korea, the Seoul 120 hotline has signed a cooperation agreement with the Korea Institute for Healthy Family. Together with the Danuri Call Center, they co-built a service and cooperation system that leverages collaborative governance to help foreigners adapt to life in Korea and actively eliminate the inconveniences caused by language barriers.

(3) Expanding International Cooperation

The Seoul 120 hotline regularly holds on-site events to widely share its operational and management experience both domestically and internationally. To date, the hotline has hosted government agencies from more than 50 countries and regions, including the United States, China, France, Sweden, Russia and Singapore. Over 800 organizations have visited for exchanges. These activities demonstrate the international influence and recognition of the Seoul 120 hotline.

Currently, the hotline's diverse cooperation is still expanding. Building on its original foreigner hotline service, Seoul plans to analyze changes in the nationality composition of foreign residents in the city and respond dynamically to their diverse consultation needs to further improve its cooperation system. The city hopes to continue optimizing the language service system, gradually introduce more foreign language services, and ensure broader coverage of foreign residents. It also aims to enhance cross-national and cross-cultural communication skills, improve the inclusivity of services, and expand the breadth and depth of services.

■ Valuable Experience

The integration of service content is a foundational measure that enables the Seoul 120 hotline to operate efficiently and is an indispensable part of its success. By integrating services across various departments, the hotline has strengthened service integration and professionalism, and further improved response quality and citizen satisfaction. Additionally, the integrated hotline service model has facilitated optimized government resource allocation and improved resource utilization efficiency, thus laying a solid foundation for further improving the hotline service system.

15 Shanghai 12345 Hotline: Exploring Smart Service Models and Strengthening Support for Decision-Making

Case Overview

As an important platform for serving citizens, the Shanghai 12345 hotline has actively explored intelligent service models and strengthened decision support capabilities. It constantly promotes responses to business and citizen complaints with the same hotline to handle a wide range of issues related to business entities and people's livelihoods. The hotline strictly enforces time limits for responses, enhances interdepartmental collaboration, and focuses on data mining to improve service capabilities. The aim is to provide efficient responses to complaints from citizens and businesses, resolve them properly, and address complaints at the source.

Best Practices

(1) Creating Interactive Scenarios for Multi-Channel, Intelligent Service Applications

To further provide citizens and businesses with better intelligent service experiences, Shanghai has relied on digital applications to create multiple complaint response channels. During the 2024 New Year holiday, the Shanghai International Services website started its trial run. The Shanghai 12345 hotline actively leverages the website's messaging channel to promptly handle related complaints and provide policy information to foreign nationals arriving in or residing in Shanghai, with the aim of building a friendly city. The multi-participant sign language video call mini-program has been developed to enable three-way video calls, enabling hearing-impaired individuals to feel the warmth of the city. The hotline has set up access to its services in the Alipay app. The open hotline knowledge base, Diandiantong, has been continuously optimized to enable citizens and businesses to search for policies. Collaborative efforts with the judiciary, police and transportation departments have led to the addition of columns on the hotline's official website, mini-program and other platforms to accept and process relevant reports regarding the special campaigns against major road traffic safety and transportation law enforcement issues, and against major accident hazards.

The Shanghai 12345 hotline has also conducted innovative explorations in areas such as cross-regional digital integration and collaboration of hotline resources. For example, it has achieved efficient integration with the 110 emergency service platform to divert non-police-related assistance and swiftly handle emergency police-related situations, thus enhancing collaborative service effectiveness. The hotline has also strengthened cooperation with Jiangsu, Zhejiang and Anhui provinces in areas such as technological development, call transfers and the unification of issue categorization standards. In this way, it has further extended the reach of hotline services, collaborated to address cross-regional complaints, and promoted high-quality integrated services for 12345 hotlines in the Yangtze River Delta region.

Figure 5-36: Various special seats of the Shanghai 12345 hotline

(2) Leverage Advanced Technology to Upgrade and Transform the Hotline Production Platform

The Shanghai 12345 hotline has upgraded its hotline production system and perception platform by introducing distributed microservices and storage, cloud GIS application services, as well as new technologies and algorithms such as big data, cloud computing and AI. This upgrade has strengthened the monitoring of processes and quality supervision for handling complaints from citizens and businesses. Based on the achievements of the first phase of the hotline perception platform, the system has further enhanced applications of special algorithms and intelligent assignment models for flood control, typhoon response, fire safety, and the China International Import Expo. The system has also improved intelligent applications in areas such as callbacks, verification, spot checks, supervision, and special rectifications for high-frequency complaints.

Building on the iteration of the perception platform, Shanghai has continuously upgraded its hotline production system, redesigning and reshaping the hotline production process. It analyzes and interprets large amounts of data, makes comprehensive assessments, and improves hotline efficiency

Figure 5-37: AI training of the Shanghai 12345 hotline

in practical scenarios such as intelligent Q&A, smart hotline forms, smart training and intelligent analysis. The hotline's directory system has been restructured to have more detailed classifications, creating a five-level directory classification system that improves the accuracy of manual classifications and makes the hotline form system more standardized and intelligent.

To further strengthen public sentiment perception, the Shanghai 12345 hotline has updated its data screen applications, and explored the development of a hotline form tagging system and digital health system. It has also introduced tools like heat maps to achieve intelligent visual iteration and upgrades. On display screens, the system shows the QR code for daily voices of citizens, performance efficiency of districts and sub-districts, as well as emerging, trending, challenging and bottleneck issues, providing a more intuitive presentation of public sentiment and situation analysis. The hotline has also worked to improve its data system security and development coordination, ensuring the stability and reliability of the hotline data and system through network security self-checks and system protection self-assessments.

(3) Developing Special Models to Categorize and Analyze Citizens' Complaints

The Shanghai 12345 hotline uses intelligent algorithms from the perception platform to deeply analyze and assess hotline operations in specific districts and departments, thereby matching public concerns, enhancing comprehensive analysis, and jointly addressing complex issues. This helps shift from solving individual issues to addressing different categories of issues, providing municipal leaders with scientific decision-making references. The hotline also delves into complaint information related

to livability, social governance and safety warnings, strengthens intelligent hotline data analysis, and improves mechanisms for reporting hotline information, interdepartmental collaboration and data technology support. The platform produces weekly reports on major issues to quickly identify risks in areas like fire escape routes, housing safety, flood and typhoon control, and living assistance, prompting relevant districts and responsible entities to take immediate corrective actions.

The Shanghai 12345 hotline also focuses on analyzing business-related complaints to help optimize the business environment. By analyzing the needs of enterprises, introducing expert advisory teams, and establishing specialized data analysis teams, the hotline develops models for analyzing enterprises' complaints. Monthly reports are produced for policy hotspots that enterprises are concerned about, such as policies on specialized and sophisticated enterprises producing new and unique products, technology innovation vouchers, AI, and synthetic biology. The hotline also releases special reports for the China International Import Expo and the Yangtze River Delta region. All these efforts help the city foster a world-class business environment.

Figure 5-38: Various special reports from the Shanghai 12345 hotline

Since its inception, the Shanghai 12345 hotline has processed over 60 million pieces of data. To further enhance the social value of hotline data, it has collaborated with relevant departments to improve the efficiency, accuracy and traceability of hotline work circulation across departments and regions. This effort ensures smoother business and data flows, thereby improving handling efficiency

and facilitating full-process oversight. The hotline has continued to expand its "1+1+X" model and explore collaboration with relevant entities on community governance indices and civility indices to jointly identify problems in urban operations.

Valuable Experience

The Shanghai 12345 hotline actively explores new pathways for digital transformation, enhancing research on applying new-quality productive forces in hotline work. Through digital transformation projects such as the production system overhaul and the second phase of the perception platform, it builds interactive scenarios for multi-channel, intelligent service applications to raise the efficiency of complaint acceptance, handling and processing and improve the interactive experiences of citizens and businesses. By leveraging advanced technology and deeply analyzing data, the hotline promptly captures major public sentiment trends, supports the leadership's decision-making, and plays a pivotal role in megacity governance. The Shanghai 12345 hotline provides a new paradigm for digital governance in megacities.

16 Singapore's OneService Platform: A Comprehensive Intelligent Service Hub

Case Overview

Singapore's OneService platform is dedicated to providing comprehensive, efficient and user-friendly urban services, and has established itself as a vital bridge between citizens and the government. Driven by the digital revolution, the platform has evolved from a basic feedback tool into a sophisticated, multifunctional intelligent service hub. By integrating diverse service channels, developing a smart and efficient data management system, and leveraging in-depth big data analysis to enable precise decision-making, the OneService platform plays an indispensable role in strengthening the bond between the government and citizens, improving the quality of public service delivery, and advancing the modernization of urban governance.

Best Practices

(1) Integrating Service Resources to Enhance Public Service Responsiveness

The OneService platform simplifies the traditionally cumbersome process of citizens interacting with multiple departments or platforms by consolidating resources into a one-stop service hub.

In 2021, the OneService platform innovatively deployed its chatbot, Kaki, on mainstream

Figure 5-39: Integration of public services on the OneService platform

messaging apps such as WhatsApp and Telegram. This allows users to interact seamlessly with the platform via commonly used communication tools, eliminating the need to download additional applications.

Citizens can easily report various municipal issues through a single platform, which then automatically redirects their concerns to the appropriate department. This significantly reduces response times and improves service efficiency. The platform also offers a comprehensive feedback management suite. With the case tracking feature, citizens can monitor the real-time progress of their cases, while the "Case Map" feature provides a visual representation of issue distribution across the city. Cases are clearly color-coded by status: green for resolved, yellow for in-progress, and red for pending, with the responsible agency explicitly identified to facilitate further communication if necessary. Once an issue is resolved, citizens can rate their service experience, a feedback mechanism that further enhances service quality.

(2) Data-Driven Targeted Services Optimizing Resource Allocation

The OneService platform effectively leverages predefined categories and sub-categories to optimize its automated complaint-routing mechanism. When citizens file complaints, the selected categories and their descriptions serve as critical clues. By intelligently analyzing keywords within this information, the system accurately identifies the domain of the issue and routes it to the appropriate department.

The platform also adopts an innovative problem-solving approach. By conducting in-depth analysis of extensive complaint data, it identifies high-volume, low-complexity issues, such as minor damages to public benches or weed overgrowth in community gardens, and directly assigns them to contractors, bypassing traditional intermediary government processes. This innovative model not only reduces procedural redundancies but also significantly cuts administrative costs. Meanwhile, the platform uses AI and big data technologies to analyze the data, providing insights into citizen needs and issue distribution. This targeted approach enables departments to allocate human and material resources more rationally, focus on their areas of expertise and avoid the waste of resources. Consequently, more resources can be directed toward addressing citizens' most urgent and critical

Figure 5-40: Illustration of resource coordination on the OneService platform

needs, optimizing resource allocation and enhancing service quality.

(3) Building a Collaborative Ecosystem to Advance Refined Urban Governance

The OneService platform has established an efficient collaborative governance system, encouraging businesses and research institutions to participate in data collection and utilization. This multi-stakeholder, data-driven model fosters refined and intelligent urban governance.

In practice, this collaborative governance system demonstrates exceptional synergy in tackling complex urban issues and serving as a vivid example of advancing fine and intelligent urban governance.

For instance, in addressing urban parking challenges, the system integrates resources from various sides, showcases its innovative and cooperative potential. On one hand, it collaborates closely with large enterprises, and harnesses data from urban infrastructure such as lamp posts. These lamp posts are transformed into key nodes of a smart parking network, creating a citywide system that monitors the real-time status of parking spaces. Intelligent algorithms predict and guide parking demand, maximizing parking resource utilization.

On the other hand, the platform opens transportation data to numerous startups, and uses smartphones and apps to gather data on user parking needs and travel habits. This data is then shared with the platform. By integrating and analyzing data from diverse sources, the database is constantly updated in real time to ensure data timeliness and accuracy.

In high-demand and complex areas, such as commercial districts and hospitals, innovative models like parking spot sharing are adopted to effectively increase parking turnover rates, thereby addressing the parking difficulties in key areas and special scenarios.

■ Valuable Experience

Singapore's OneService platform has significantly enhanced public service response efficiency through innovative integration of service channels, service resource integration and feedback mechanisms. This process for addressing citizen concerns not only improves convenience and efficiency but also boosts citizens' trust in and willingness to use the platform.

Through intensive data analysis, the platform increases precision in hotline services and optimizes resource allocation. Furthermore, the OneService platform promotes open data sharing and fosters broad collaboration with businesses and research institutions. Businesses can leverage the data to develop more user-friendly applications, while research institutions utilize the platform's big data for in-depth studies, generating theoretical insights and innovative solutions for urban governance. By building a collaborative ecosystem, the platform provides citizens with more comprehensive and convenient services.

17 Tokyo Metropolis' "Voice of Citizens": Amplifying Public Input for Democratic and Data-Driven Policymaking

■ Case Overview

To address the challenges of posed by separate hotline platforms, information asymmetry, and fragmented management, the Tokyo Metropolitan Government recently launched the Voice of Citizens platform. Unlike the government service hotlines in other cities, the platform emphasizes collecting citizen opinions and complaints and transforming them into policy improvements. This approach strengthens communication and interaction between citizens and the government, and raises the efficiency of public services. As a pioneering effort to make public policies more democratic and scientific, the Voice of Citizens platform plays a significant role in the formulation, analysis and evaluation of public policies, and offers valuable insights for the development of similar platforms in other cities.

■ Best Practices

(1) Integrating Public Opinion Through Multiple Channels

Tokyo residents can submit their suggestions, opinions and requests to the platform through various channels, including hotline calls, visits to designated contact points, online submissions, faxes, mailed letters and suggestion box contributions. These submissions are directed either to the

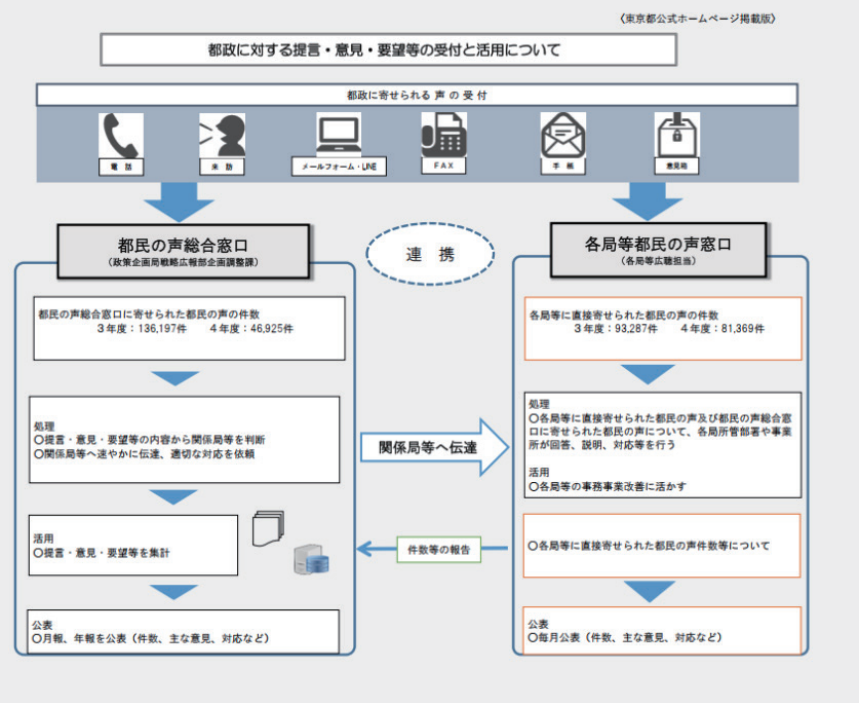


Figure 5-41: Operation process of the Voice of Citizens platform

the platform's central hub or to specific government department offices. The comprehensive hub promptly identifies the relevant department, initiates contact and monitors the progress of issue resolution. The hub will regularly collect suggestions, opinions and requests from citizens and publish them in the form of monthly and annual reports.

After receiving public requests, government departments make responses and explanations to improve related administrative services. They also share statistical summaries of the requests with the platform's central hub, and issue monthly reports about the number of suggestions received, their content, and the measures taken in response. Beyond connecting government departments, the Voice of Citizens platform also facilitates communication between citizens and the Tokyo Metropolitan Assembly. Citizens can anonymously submit their opinions and requests to the Assembly to participate in legislative matters.

The platform functions as a comprehensive multichannel hub for gathering and integrating information, providing substantial support for policy formulation, analysis, and evaluation in Tokyo Metropolis.

(2) One-Stop Information Display

The Tokyo Metropolitan Government integrates various types of public information, such as administrative updates, financial data, news and transportation information, and publishes it on the official government portal. Residents can access this website to stay informed on a wide range of topics.

Figure 5-42: Section of metropolitan government information on the Tokyo Metropolitan Government's website

Figure 5-43: AI-powered virtual assistant on the Tokyo Metropolitan Government's website

To facilitate access to information, the Tokyo Metropolitan Government website is designed in a minimalist, information-based approach. Citizens can search for the contact information of relevant departments based on administrative divisions, departmental attributes, or types of affairs. The website also features an AI-powered virtual assistant to help users find the information they need. The metropolitan government information section serves as a platform for the government to share various types of information and engage in dialogues with citizens. The Voice of Citizens platform plays a crucial role in this area. After reviewing relevant information, citizens can directly contact the appropriate departments. If they are still unsure which department to reach, citizens can use the Voice of Citizens platform to provide feedback to the Tokyo Metropolitan Government.

(3) Routine Analysis of Citizens' Needs

Beyond serving as a platform for communication between citizens and the government, the Voice of Citizens platform plays a significant role in the analysis, formulation and evaluation of public policies. The platform conducts statistical analyses of citizen inquiries, suggestions and other information, with findings incorporated into monthly and annual analytical reports published by the policy planning bureau. These reports collect, analyze and respond to public voices, thus communicating important information to citizens and also supporting the analysis, development and evaluation of public policies.

The monthly reports primarily summarize proposals and requests received by the platform, providing statistics on the number and types of proposals received during the month. They also include a selection of proposals by topic, accompanied by responses. The annual reports focus on significant work of the platform, including statistics on the number of proposals and responses. These reports integrate major cases in various fields such as administration, safety, economy and

welfare, and offer corresponding responses. By compiling these annual reports, the government not only identifies key areas of public concern but also delivers solutions and measures. Furthermore, significant issues raised through the proposal system can be escalated to the legislative process for resolution.

Valuable Experience

The Voice of Citizens platform has effectively lowered the threshold of government-citizen interactions by establishing a policy information chain, integrated diverse urban service portals to offer clear government information, and accurately transferred public complaints, thereby significantly enhancing the flexibility and efficiency of government-citizen interactions.

First, establishing a policy information chain. Acting as an information hub, the platform allows citizens to express suggestions, opinions and complaints through multiple channels, significantly lowering the barriers to communication with the government. This improves the flexibility of interactions between citizens and authorities.

Second, integrating urban information portals. The Tokyo Metropolitan Government's website features a high degree of integration, enabling citizens to clearly access various government-related information. On this foundation, the Voice of Citizens platform has created a comprehensive hub for interactive communication between citizens and the government.

Third, accurately conveying public concerns. Citizens using the platform do not need to categorize their concerns themselves. Government staff review and process submissions to ensure that citizens' complaints are effectively transferred to the appropriate government agencies.

18 Toronto 311 Hotline: Expanding Service Accessibility Through Multiple Channels

Case Overview

Toronto's 311 hotline is a key public service platform of the city and is designed to provide residents with convenient and efficient access to information and solutions to their issues. To adapt to evolving needs and deliver higher-quality services, the hotline has expanded its reach through multiple online channels, including a website and mobile platform. This broadens service accessibility, ensuring that citizens can seek assistance anytime, anywhere. Meanwhile, the hotline pursues simplicity, transparency and efficiency in its service processes while respecting users' individual needs. By offering an intelligent user experience, the 311 hotline has enhanced service efficiency, deepened interaction with residents, and significantly improved public satisfaction.

Best Practices

(1) Building an Integrated Web-Based Service Platform

Toronto's 311 hotline has enhanced its traditional service channels, and developed and enhanced online service platforms to boost operational efficiency. The web platform, Toronto at Your Service, integrates functions such as filing complaints, tracking progress and searching for service information, offering residents, businesses and tourists a one-stop service experience. The platform also categorizes popular topics and high-frequency service requests to give citizens easy access to the information they need and reduce their time costs.

The homepage prominently displays contact details for various service channels, helping users easily choose their preferred method. For instance, it specifies hotline numbers for calls within and outside the city and provides direct links to mobile apps, email, and social media platforms.

To maximize accessibility and improve the experience for non-native English speakers, the web platform incorporates Google Translate and supports over 130 languages. This feature allows residents to accurately convey their requests and receive assistance in their preferred language.

(2) Developing Real-Time Mobile Services

To further streamline service processes and enhance efficiency, Toronto launched a new mobile app, 311 Toronto, in 2022. This app allows residents to connect with the 311 hotline anytime, anywhere, supporting self-service submission for over 600 types of service requests. The app also features real-time responses and access to an online knowledge base.

The mobile platform offers a range of user-friendly features, including precise service request location tagging through GPS, the ability to upload attachments using the camera function for

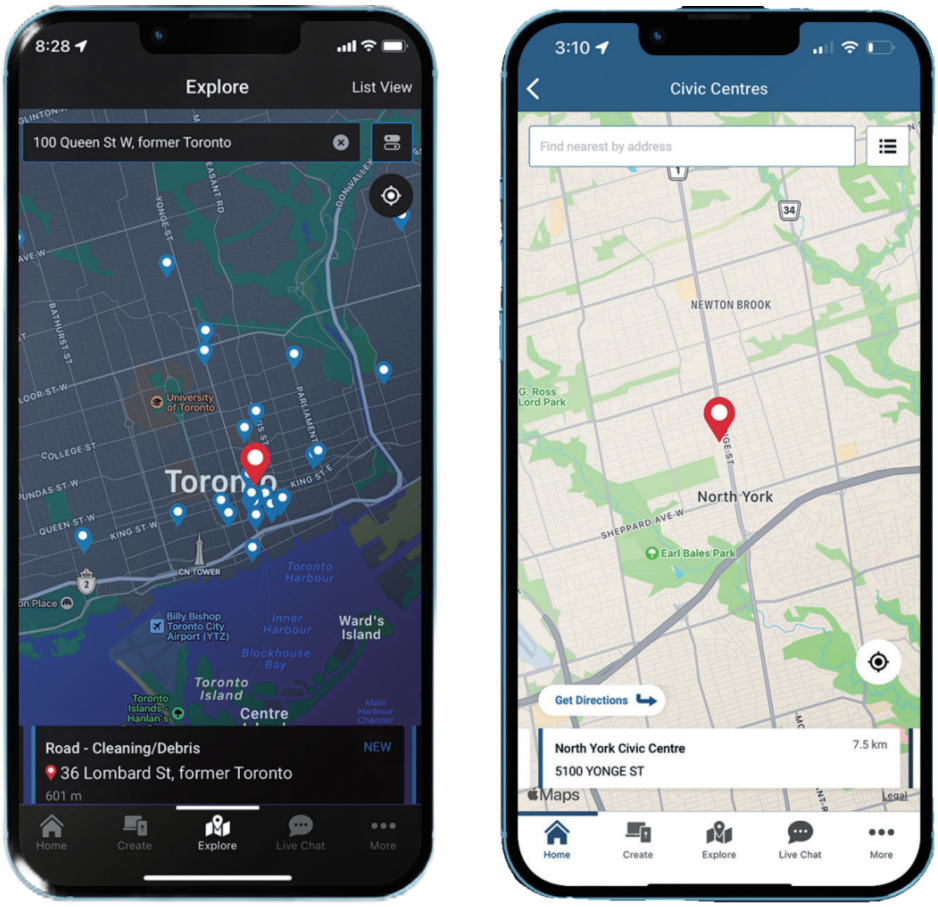


Figure 5-44: Map function in the 311 Toronto mobile app

additional context, and options to confirm service appointments and receive reminders and notifications. Catering to the diverse needs of residents, it allows users to view unresolved community requests, explore nearby points of interest and personalize app settings.

The introduction of the mobile app has enabled hotline staff to more accurately receive issue reports and respond promptly, while also offering citizens a smarter and more personalized service experience. This reflects the city's commitment to continuously innovating service models and advancing urban service modernization.

(3) Using Online Data to Support Decision-Making

Toronto's 311 system leverages online channels to collect data from citizens' inquiries, complaints and suggestions, providing an authentic reflection of public needs and urban operations. This data enables the city to track development trends, support urban management agencies in making more reasonable and scientific decisions, and use technologies like big data analysis to promptly identify potential issues and develop targeted solutions.

For example, in response to the challenges posed by a major public health event in 2020, the

Toronto 311 hotline swiftly adjusted its strategies to prioritize responses to the influx of citizen inquiries about the evolving situation. Based on the information gathered, many government employees were redeployed to meet higher-priority service demand in places such as shelters and long-term care facilities. Moreover, the 311 system plays a crucial role in providing non-emergency services to residents on behalf of local government agencies.

■ Valuable Experience

Enhancing online channels significantly has significantly improved the efficiency of hotline services. Citizens can log in anytime, anywhere, without the need to wait for an agent to answer, thus greatly reducing response time. Whether they are seeking policy information, reporting an issue or requesting assistance, they can complete their filing with just a click or tap. Features like online knowledge bases allow citizens to find answers quickly. Meanwhile, staff can use tools such as map-based location tracking to identify citizens' locations and provide tailored services, thereby boosting service efficiency.

Meanwhile, strengthening online channels can effectively promote public engagement. Citizens gain easier access to information about the services offered by the Toronto 311 hotline, making them more willing to report urban issues and actively participate in city building and management. This fosters a positive social atmosphere and drives continuous improvement in urban governance.

19 Wuhan 12345 Hotline: Driving Systemic Innovation and Enhancing Hotline Resilience

Case Overview

The Wuhan 12345 hotline has actively explored improvements in institutional frameworks, processes and mechanisms, technological applications and work models. It has evolved from a single telephone line into a convenient and efficient service platform, becoming a critical hub for collaborative governance. This transformation supports smart governance and elevates the system and capacity for urban governance to new heights.

Best Practices

(1) Strengthening Institutional Frameworks to Build a Solid Foundation

The Wuhan 12345 hotline emphasizes institutional development. It has issued a series of documents under the names of the municipal Party committee and government, such as guidelines on strengthening hotline operations and plans for hotline integration and enhancement. Additionally, the hotline has compiled the Mayor's Hotline Work Mechanism and the Wuhan Citizen Hotline Work Manual. Work procedures across the acceptance, assignment, processing, and evaluation stages have been refined to ensure closed-loop management for addressing public complaints. A service network involving over 170 collaborative units has been established, fostering a multi-participant service system that improves efficiency and quality and provides more comprehensive and thoughtful services.

The hotline has improved its evaluation system, ensuring full-process closed-loop management. First, it integrates daily dynamic assessments, monthly performance notices and year-end evaluations, with results submitted to the performance evaluation office and included in citywide performance appraisals. Second, a mechanism integrating supervision and inspection has been implemented to regularly forward clues about misconduct, inaction or improper actions to the municipal office that fights incompetence. Third, a third-party reviewer mechanism has been introduced, enlisting over 1,000 external reviewers to publicly evaluate the handling performance of responsible units, thereby enhancing public participation and transparency.

(2) Optimizing Processes and Mechanisms to Improve Service Efficiency

The Wuhan 12345 hotline continuously refines workflows and mechanisms enhancing a problem-solving chain to enhance the efficiency of services for businesses and citizens. When sorting out reported issues, it follows a standard list of prioritized complaints, ensuring accurate assignment of tasks with a 99.5% accuracy rate. In the assignment phase, the hotline integrates complaint acceptance

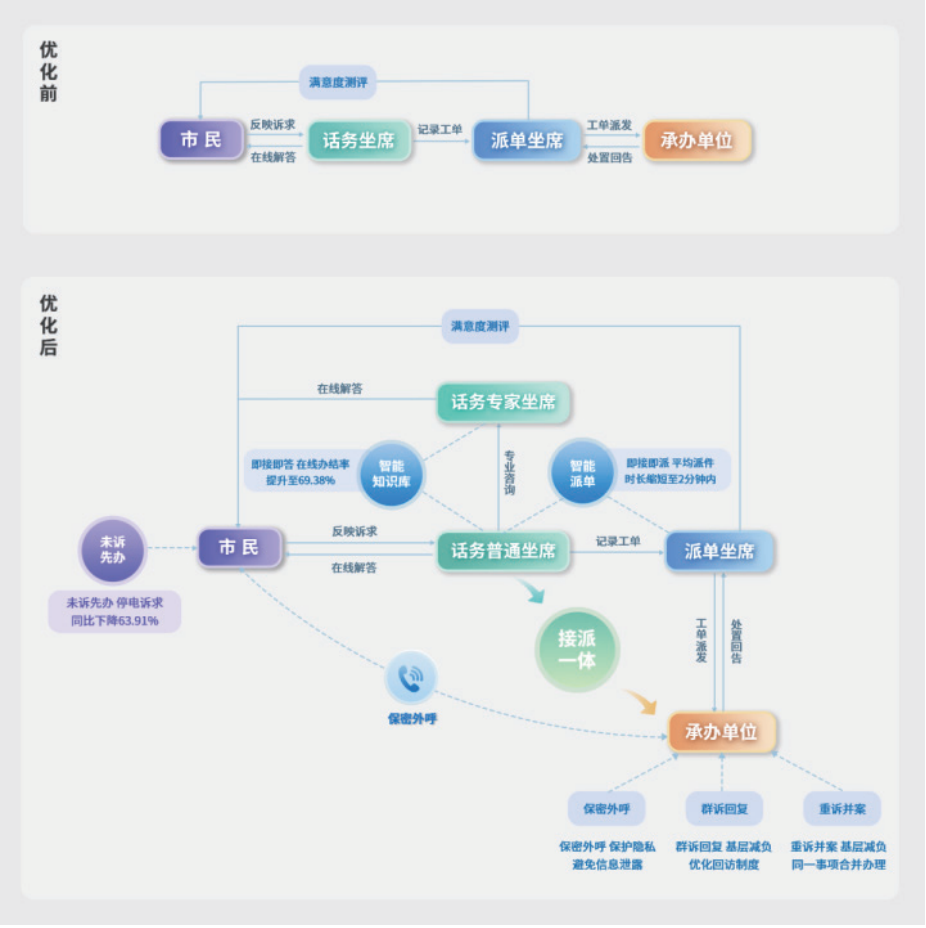


Figure 5-45: Comparison of handling processes before and after optimization

and task assignment, replacing the previous two-step process of front-desk acceptance and back-end assignment with immediate assignment of tasks. The hotline thus can assign tasks to the responsible entities within two minutes, significantly improving response timeliness. In the processing phase, complaint merging workflows have been improved to merge repetitive complaints made by the same individual for the same issue within a single processing cycle after review. During the follow-up phase, the system for following up on group-related complaints has been improved, allowing responsible units to use short messages via the hotline platform to provide feedback on processing outcomes, thereby reducing the workload of follow-up calls. Furthermore, a dispute resolution mechanism has been established, keeping the rate of rejected assignments below 1%.

In emergencies such as extreme weather, Wuhan's 12345 hotline rapidly activates its emergency response mechanism to ensure uninterrupted phone service, platform operation and processing quality. The call connection rate consistently exceeds 90%, with urgent issues affecting public health and safety handled immediately and resolved daily. This demonstrates the hotline's remarkable resilience. Notably, during the snow and ice disaster at the beginning of 2024, the hotline promptly initiated its emergency response, offering around-the-clock point-to-point coordination for urgent issues such as transportation and public utilities. The efforts ensured that citizens' needs were

addressed in a timely manner.

(3) Strengthening Technological Support to Enhance Responsiveness and Handling Capacity

The Wuhan 12345 hotline has embraced innovative development by leveraging new technologies and tools to improve management efficiency and service quality. It has introduced intelligent assistant systems and voice robots, developed an intelligent big data platform, and achieved refined call management and automatic archiving of processed complaints. Through digital and intelligent advancements, an AI-powered perception engine has been developed to conduct intelligent training, enabling multidimensional data analysis, indicator monitoring, issue identification and predictive warnings, as well as routine monitoring and reporting. Additionally, a secure outbound calling system was launched to encrypt complaints required to be kept confidential by citizens, thus preventing information leaks and safeguarding personal privacy.

In critical periods such as freezing rain events and the cherry blossom season of 2024, the hotline system maintained round-the-clock monitoring to ensure prompt and effective handling of all key cases. On February 24, 2024, the hotline received an urgent request in which a citizen reported that a person near Baishazhou market had suffered a head injury from a collapsed shelter. The injured individual was rushed to the hospital, where intracranial bleeding was discovered, necessitating the immediate transfusion of a specific blood type that the hospital's stock could not supply. Upon receiving the request, the hotline's intelligent system swiftly classified the incident as an emergency and forwarded it to a supervisory specialist. The citizen hotline office prioritized the case and coordinated with the blood center for emergency blood supply. The entire process, from the request to the life-saving transfusion, was completed within one hour, fulfilling the hotline's critical role as a lifeline for citizens. This case showcases the hotline's responsiveness and efficiency in handling emergencies.

Figure 5-46: Alerts issued by the public service large model for utilities

(4) Improving Work Model to Strengthen Proactive Governance

Focusing on proactive governance, the Wuhan 12345 hotline has driven innovation in its work model by advancing from "responsive service" to "preemptive action." In addition to efficiently handling requests, the hotline conducts daily analyses of prominent public concerns and recurring issues, and categorizes them to identify patterns and compile representative cases, serving as a "sentinel" for public opinion. Centering on the major work of the city and the hot spots, difficulties and key concerns of citizens, the hotline systematically examines complaints to move from observing the phenomena to identifying patterns, and from analyzing the present to forecasting the future. Based on these analyses, it proposes targeted recommendations to make the work of the government more forward-looking and proactive.

For instance, using integrated analysis of high-traffic cases and regional hotspots, the hotline identified patterns and applied predictive modeling to launch a public utilities model for electricity, water and gas services. The system flags neighborhoods with high complaint volumes or phone numbers related to repeated complaints. When a power outage or water disruption is imminent in the abovementioned areas, the system will automatically trigger an alert and send out text messages to notify residents in advance, allowing them to make necessary preparations. As of September 30, 2024, the system had issued 20 power outage alerts affecting 2,865 individuals, leading to a 63.91% year-on-year drop in related complaints in the period. During extreme weather events, the system also provides timely updates on bus service suspensions and road closures, reducing bus-related complaints by over 50%.

■ Valuable Experience

Systematic innovation and full-process closed-loop management are two salient features of Wuhan's 12345 hotline, offering valuable insights for other cities seeking to improve their government service hotlines and adapt to ever-evolving societal demands.

Systematic innovation is the cornerstone of the vitality and resilience of Wuhan's 12345 hotline. With innovations in institutional frameworks, procedures and mechanisms, technological applications and operational models, the hotline has transformed from a single telephone and a line into an efficient and convenient service platform. By boosting collaboration among various entities, it not only enhances service efficiency and quality but also makes services more comprehensive and thoughtful. Moreover, this approach strengthens the hotline's adaptability and foresight, enabling it to respond swiftly to social changes and technological advancements.

Full-process closed-loop management is another hallmark of Wuhan's 12345 hotline. By establishing a comprehensive evaluation system and a supervision and inspection mechanism, it ensures that every complaint is processed within a closed loop. This approach guarantees timely and effective handling of all complaints, increases transparency in service delivery, and improves public satisfaction. Notably, the introduction of a third-party reviewer system has enhanced public participation and oversight and further elevated the quality of services.

20 Xi'an 12345 Hotline: Leveraging Hotline Data to Improve People's Lives

Case Overview

The Xi'an 12345 hotline consistently strengthens its data-driven capabilities, refining mechanisms such as case categorization and swift response to provide maximum convenience for citizens and businesses seeking consultation or assistance. Leveraging digital tools, the hotline enhances correlation analysis, systematic evaluation and coordinated efforts to transition from addressing individual cases to resolving broader categories of concerns. With a focus on facilitating scientific decision-making, the hotline raises the quality and effectiveness in tapping data mining potential to offer forward-looking and predictive insights and fully realize the value of hotline data for improving people's lives.

Best Practices

(1) Enhancing Call Volume Forecasting to Ensure Rapid Response

Rapid response is vital to hotline services. However, in practice, city hotline call volumes are influenced by various factors, such as societal events, policy changes, public awareness and media coverage, making accurate forecasting a significant challenge. To address this, the Xi'an 12345 hotline aggregates and analyzes operational data, employing methods such as intelligent call routing, smart scheduling and automated form-filling to ensure the smooth functioning of its services.

In terms of intelligent call routing, the hotline leverages statistical analyses of historical

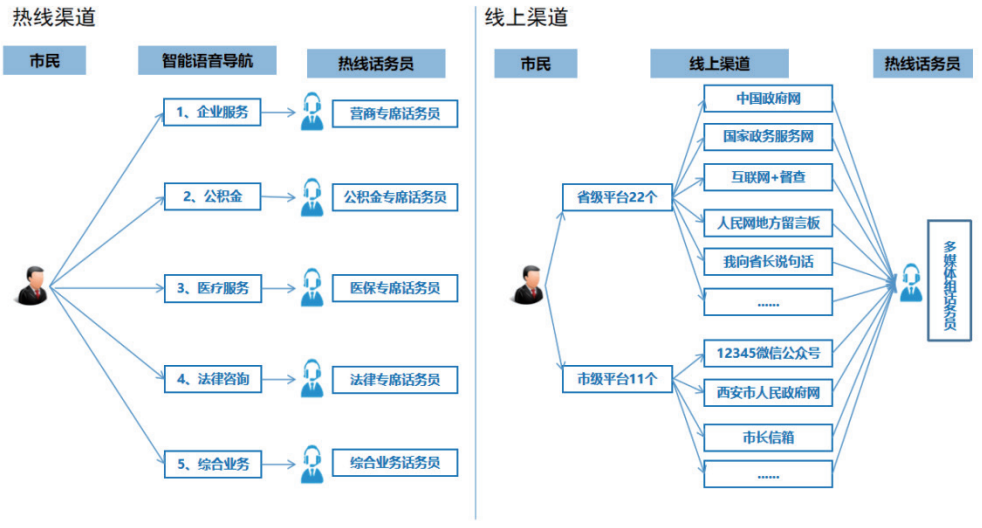


Figure 5-47: Intelligent call routing of the Xi'an 12345 hotline

consultation data to prioritize frequently addressed topics — such as enterprise services, housing provident funds, and healthcare — in its interactive voice response navigation system. By implementing voice-guided navigation, the system quickly identifies citizens' needs and routes calls precisely, thereby reducing wait times and unnecessary call transfers and improving service efficiency. Additionally, the hotline has opened multiple online channels for call routing. The Xi'an 12345 comprehensive service platform now supports 33 multimedia messaging channels, including 11 at the municipal level and 22 at the provincial level, enabling the acceptance and tracking of requests through all online channels.

In terms of intelligent scheduling, the Xi'an 12345 hotline collects historical call data and operator workload statistics spanning 24 months. After cleaning and normalizing the data, the hotline identifies trends such as lower call volumes during holidays, and peaks from 9 a.m. to 12 p.m., from 2 to 5 p.m., during tourism seasons, the start of school terms, and heating periods. Using methods such as trend distribution and regression analysis, a predictive model is constructed. This model, combined with a scheduling algorithm, generates automatic shift schedules, which are then fine-tuned manually to ensure adequate staffing during peak hours and sufficient rest time during off-hours, creating schedules that are more reasonable and employee-friendly.

In terms of automated form-filling, the Xi'an 12345 hotline dissects employee performance data to address the issue of lengthy time needed to fill in the forms after receiving calls. By leveraging ASR (Automatic Speech Recognition) technology, the system automatically transcribes call recordings and extracts key elements, including summary titles, categorization of complaints, involved parties, keywords, addresses and time. This results in automated and standardized form-filling, reducing the average filling time per operator from 210 seconds to 57 seconds.

(2) Integrating Data from Different Sources to Enable Targeted Decision-Making

Xi'an has established a social governance data analysis platform that integrates data from the 12345 hotline, municipal departments, public safety authorities and other sources. Capitalizing on large-scale modeling technology, the platform analyzes and extracts key elements from public complaints, such as involved parties, urgency, core demands, and expectations. This transition from human-driven to data-driven decision-making enables in-depth data analysis to support effective social governance.

For example, during a special analysis of property management requests in 2024, the Xi'an 12345 hotline shared data with the city's housing and urban-rural development bureau and discovered that complaints about property service quality were primarily from high-rise residential communities with property fees of 1.2 yuan per square meter. At the same time, issues such as landscaping, garbage cleaning, maintenance of fitness facilities, and falling objects involved mostly certain property management companies. This discovery played a positive role in the bureau's targeted rectification efforts and the rating of property management companies.

By thoroughly mining and utilizing hotline data on people's living conditions, the Xi'an 12345 hotline has provided 56 special reports to relevant departments. Officials from the city's housing and urban-rural development bureau, urban management bureau, state-owned assets supervision and

Figure 5-48: The Xi'an 12345 hotline data analysis platform

administration commission, veterans affairs bureau, postal bureau, Xi'an Infrastructure Investment Group, and Xi'an Metro personally took calls at the service desks, leading by example in handling complaints, supervising the resolution, and addressing tough issues. The quality of complaint handling in the city's districts, counties and development zones improved significantly, and the rate of unresolved cases continued to drop.

(3) Promoting Data Backflow to Support Proactive Governance in Districts and Counties

The Xi'an 12345 hotline has organized and categorized hotline data, and then channeled large amounts of administrative data back to districts and counties. By tapping the capabilities of the municipal platform, a data warehouse has been built for districts and counties, ensuring that the data from these local platforms can be dynamically updated in sync with the city-level platform. This approach allows for the transformation from passive services to proactive services, advancing the modernization of governance at the district and county levels.

Regarding winter heating issues, the Xi'an 12345 hotline conducted a special analysis at the beginning of 2023 of 114,000 heating-related complaints from the winter of 2022. The analysis revealed significant fluctuations in heating issues during two periods: November 11-20 and December 12-31, with most complaints focused on inadequate heating temperatures. Based on this analysis, key areas and neighborhoods were identified. This special analysis provided data support for districts and relevant authorities. Based on the features of the industry and different areas, authorities in urban management, housing and urban-rural development, and development zones, as well as urban investment entities, soon moved to support grassroots heating management departments, heating companies and property management teams in their work. From the trend of heating-related

complaints in 2023, the time it took for the volume of daily workload to decrease after peak complaint periods was significantly shortened. Both peaks in call volumes dropped rapidly within three days. This indicated that the measures taken in key regions and neighborhoods in the previous year were effective.

At the start of 2024, the Xi'an 12345 hotline conducted another analysis of heating issues based on data models. Districts and counties used this analysis to proactively understand public concerns, gather firsthand data on heating conditions, and carry out comprehensive inspections of heating systems and pipelines, ensuring smooth heating operations in 2024. For newly delivered neighborhoods, heating plans were announced or explained in advance, and proactive efforts were made to communicate with residents, realizing the goal of "treating winter illnesses in summer."

■ Valuable Experience

The Xi'an 12345 hotline focuses on data governance and is driven by technological empowerment to continuously improve hotline service quality and efficiency. The goal is to respond faster, assign tasks more accurately, and address complaints more effectively, ensuring every citizen's concern is addressed promptly and efficiently. On one hand, by aggregating and analyzing produced data, the hotline has promoted an intelligent transformation of its operations, enabling rapid responses. On the other hand, the hotline emphasizes the collection and backflow of data, using the integration of multi-source data as a foundation for in-depth analysis. At the same time, data is sent back to the districts and counties, allowing for a comprehensive and effective identification of social governance trends. This shift from passive to proactive governance provides strong data support for policy formulation and problem-solving, ultimately improving overall societal well-being.

Analysis of Case Models

As governance in megacities is invariably accompanied by enormous pressure, various cities throughout the world have actively explored city hotlines as one of the innovative methods. Researching and studying the development and applications of city hotlines enable us to better understand the logic of urban governance and seek new directions to tackle challenges in urban governance. As illustrated in previous data analysis and aforementioned case studies, city hotlines throughout the world take example from each other when operating, forming consensus such as interactivity of data empowerment, the intelligence of assisting decision-making, and coordination among diverse actors. These cities have simultaneously accumulated urban governance wisdom unique to their location through exploration of hotline development.

A genealogy of the evolution and status quo of city hotlines reveals four types of hotline-based urban governance models. The first typology is standardized governance based on city hotlines. The 311 hotlines in U.S. and Canadian cities serve as early examples, as their practices in establishing standardized operating procedures for hotline operations and data management are widely adopted. Beijing's 12345 hotline fully leverages its advantages, placing great emphasis on the standardized management and subsequent analysis of hotline data. The second typology is extended governance through hotline. Hotlines such as the 12345 hotline in Beijing, Wuhan and Shanghai, Seoul's 120 hotline, Berlin's 115 hotline and Madrid's 010 hotline exemplify important lessons from integrating multi-departmental and multi-level resources, while the hotline acts as a focal point of contact for citizens to access municipal services. Behind this integration is the hotline organization's efforts to clarify the responsibilities and relationships between agencies and to coordinate and integrate resources from the government, social organizations, and existing hotline services, thereby promoting the reconstruction of governance structures through hotline service development. The third typology is policy-based governance supported by the hotline. Hotlines such as the 12345 hotlines of Beijing, Guangzhou, Wuhan, and Shanghai, as well as Rio de Janeiro's 1746 hotline and Singapore's OneService platform, actively incorporate digital and smart governance technologies. These hotlines and platforms rely on data in integrating technological applications, intelligent data analysis, and hierarchical policy decision-making assistance. By mining high-precision data from these hotlines or service platforms, they create scenario-based governance solutions and a rich system of decision-making advisory reports, fully harnessing the consultative role of city hotlines. The fourth is responsive governance driven by the hotline. Hotlines such as the 12345 hotlines of Beijing, Hangzhou, and Xi'an focus on citizens' needs, balancing the expansion of service coverage with attention to personalized services, thereby providing more refined and agile services.

Compared to the above modalities of hotline practices, the Beijing 12345 hotline has developed a "Beijing Model" through its practical implementation that contains both uniqueness and universality. Its uniqueness lies in the fact that, driven by the city hotline, Beijing's urban governance model has evolved from a point-to-point response model to proactive governance and preventive measures in addressing urban governance needs, upgrading technological devices, and revising governance methods. This model has fostered a complex governance structure involving multi-party participation

and collaborative interactions. Technologically, it actively explores new digital and intelligent governance pathways, ultimately achieving urban governance innovation and reform through the key strategy of “Swift Response to Public Complaints”. As for its universality, in the context of the development of megacities and the iteration of digital and intelligent technologies, Beijing’s success showcases its ability to achieve a harmonious integration of enhanced government efficiency and full-process people’s democracy. It safeguards citizens' rights to be informed, to participate, to express, and to supervise, while also improving the systematization, scientific accuracy, precision, and predictability of governance. This model provides a replicable and generalizable experience for solving governance challenges in megacities. The formation and development of this model has brought fresh impetus into the modernization of urban governance and contributed "Chinese wisdom" and "Chinese solutions" to urban governance both in China and globally.

Chapter 6

Future Prospects of City Hotlines in a Global Context

I. Greater Emphasis on Resource Integration: Advancing Systemic Governance Through Institutional Synergy

City hotlines originated in London and have thrived globally. After nearly a century of transformation and innovation, they have evolved from a mere terminal for receiving public complaints to a "smart hub" that connects diverse resources. The current assessment results show that in terms of collaborative governance, although global city hotlines have made strides in areas such as making strategic plans, accelerating information flow and boosting collaboration among departments, they still have much untapped potential for promoting resource sharing and institutional synergy. To enhance overall innovation and development, future hotlines must further refine collaborative mechanisms for greater resource integration and strengthen systemic governance by fostering institutional synergy at a faster pace.

To drive the integration of resources, efforts must be made to begin with vertical alignment and build a collaborative system that connects different levels and works from both directions. Hotline management agencies should take a holistic approach to maximize overall impact, emphasizing the role of higher-level leadership to alleviate the pressure on lower-level departments. At the same time, emerging technologies should be harnessed to accelerate the flow of information across different levels, reduce communication costs and streamline governance channels. In this way, a panoramic approach to governance can be realized. In terms of horizontal efforts, it is imperative to establish a linkage mechanism that pools the collective strength of various departments. Hotline management authorities should adopt systems thinking, break down departmental barriers, and expand the hotlines' function from merely overseeing the handling of complaints by different departments to empowering the expansion of their administrative governance. This will strengthen the coordination of various governance elements, drive extensive participation in hotline operations, and promote information sharing among government agencies, market entities, social organizations and citizens. In doing so, the deep integration of data, technology, applications and decision-making across multiple domains will be accelerated.

On forming institutional synergy, emphasis should be placed on the guiding role of the rule of law. With the rapid economic and social development, people's needs are constantly growing, leading to a rise in requests that fall outside the purview of hotlines. However, due to the lack of legal basis for the operation of most city hotlines, many are ill-equipped to handle such requests. The rule of law ensures national stability, and good laws promote good governance. At present, it is essential to further regulate the rights and duties of those making requests and conduct a deeper study of the working mechanisms and responsibilities of hotline management agencies, thus continuously improving the legal and regulatory framework for city hotlines. It is paramount to standardize the basic functions of hotlines. While some cities have conducted forward-looking research on the construction of a standard system for hotlines, most hotline standards remain at the qualitative description stage, with few quantitative indicators. As a result, their applicability and enforceability are weak, and they

lack systemic and guiding power. High-quality development starts with standards. In the future, city hotlines should focus on key areas such as categorizing complaints, data governance, knowledge base development and performance evaluation to strengthen the overall design of hotline standards. Such standards should align with laws and regulations, solve development challenges, and be able to advance urban governance systems.

II. Greater Emphasis on Channel Development: Achieving Accessible Governance Through Multifaceted Integration

Global city hotlines originated from a simple combination of a phone and a number, but as time has progressed, the traditional call center model relying on a single channel is no longer sufficient to meet citizens' growing needs for convenience and efficiency in public services. It also cannot keep up with the deepening practice of diversified and integrated social governance in cities. At the 20th National Congress of the Communist Party of China (CPC), General Secretary of the CPC Central Committee Xi Jinping made a forward-looking call for making public services more balanced and accessible. The direction for global city hotlines to explore accessible governance lies in building on the channel infrastructure of city hotlines, promoting the deep integration of multiple stakeholders, ensuring the objective accessibility of service facilities, the diversity of service resources and the convenience of service methods.

Expanding telephone reception channels. Traditional hotlines often rely on a single phone number, which limits the access methods and time periods. To improve service convenience and coverage, hotlines need to actively expand telephone reception channels, integrating non-emergency public service numbers with emergency assistance hotlines for coordinated operation. Additionally, text message services, voicemail and other diverse methods can be introduced to make public services more accessible.

Strengthening online portal development. With the widespread use of the internet, online portals have become an important way for citizens to access information and services. In the future, global city hotlines should place greater emphasis on building online portals, offering services such as online consultation and making complaints and suggestions via official websites, mobile apps, and WeChat mini-programs to improve service efficiency. They should also open interactive channels on social media platforms like WeChat, Twitter and Facebook, allowing citizens to more easily participate in urban governance.

Integrating the media for interactive communication. The media is a vital bridge connecting the government and citizens. Global city hotlines can collaborate with media outlets to promote hotline services through television, radio, newspapers and other channels, raising public awareness and participation. Media interaction can also be used to collect citizens' opinions and suggestions to provide valuable reference for government decision-making. This can transform abstract ideas into concrete actions and pool scattered efforts, thereby enhancing governance efficiency and achieving accessible governance.

III. Greater Focus on Intelligent Applications: Upgrading Smart Governance Through Technological Integration[77]

At the beginning of the 21st century, the widespread adoption of the Internet of Things, cloud computing and big data technologies spurred the third wave of informatization: the data-driven stage of intelligent applications. This has made the adoption of smart technologies a natural trend for transformation and development across industries. As an important bridge for citizens' engagement and government communication, city hotlines have become a key force in driving the development of digital government. Their transformation to become more intelligent is not only a reflection of technological innovation but also at the forefront of urban governance innovation.

Looking at the technological evolution of global city hotlines, they have undergone changes from the telecommunications era to the internet era, and then to the digital era. In recent years, the rapid development of AI infrastructure has brought about breakthroughs in new technologies such as speech recognition, natural language understanding, computer vision and multimodal integration. Notably, the emergence of large models like ChatGPT, with its powerful capabilities in information retrieval, data analysis and interaction, has opened new opportunities for the intelligent application and development of city hotlines. As various technologies gradually permeate the hotline sector, they are being integrated into multiple stages of hotline processes, including receiving calls, dispatching tasks, prompt resolution, supervision and evaluation. New applications such as smart call handling, intelligent response, automated task assignment, intelligent oversight and smart follow-ups are emerging. This enables hotlines to keep pace with the times, prioritize intelligent applications, and accelerate entry into the intelligent era, thus facilitating scientific management of requests and promoting smart urban governance.

However, according to the assessment results, the intelligent development of most city hotlines still faces significant shortcomings. For example, intelligent hotline service still has limitations in semantic understanding, multi-turn conversation capability and human-machine integration. Intelligent follow-up faces constraints in analyzing unstructured data. Additionally, intelligent quality oversight still has room for improvement in effectively monitoring service calls and key content. These deeper issues stem from inadequate technological application capabilities, limited awareness by authorities in charge, the lack of industry standards for hotlines, and weak awareness among hotline service teams.

In the future, to drive the upgrades of urban smart governance through hotlines, there needs to be a greater focus on improving intelligent operation management and smart decision-making levels during the adoption of intelligent applications. Emphasis should be placed on human-machine collaboration, and the quality and efficiency of city hotline services should be enhanced through technological empowerment. Meanwhile, efforts must be made to balance the speed of adopting intelligent applications with the warmth of hotline services. It is crucial not to focus solely on the efficiency improvements brought by intelligent applications while neglecting the real experiences of citizens.

IV. Greater Emphasis on Data Mining: Driving Scientific Governance Through Precise Analysis

Cities are the pioneering practical scenarios for data governance, and data is the key to urban management. City hotlines gather vast amounts of data every day, and because this data is actively generated by citizens, covers a wide range, breaks through time and space limitations, and integrates emotional expressions, it provides a "gold mine" for data analysis and mining, supporting scientific decision-making and the refined governance of society. The current assessment results show that city hotlines across various regions are actively exploring data governance and scenario applications to improve management effectiveness in areas such as understanding public sentiment, aiding precise policy implementation, and risk monitoring and warning.

However, it is important to recognize that in the complex realities of urban governance where services and communication are often inefficient, city hotlines still face shortcomings including a lack of data standards and norms, a shortage of technological talent and infrastructure, and a gap in governance vision and thinking. As a result, the development and utilization of this "gold mine" remain limited in many cities, with data analysis often staying at the stage of basic data display and rough analysis. For instance, many cities can only perform simple statistics, such as call connection rates, resolution rates and satisfaction rates, in daily reports; they often just list requests and hot issues. There is a considerable gap between this and true big data analysis, correlation analysis, forecasting and early warning, making it difficult to achieve precise analysis that drives scientific governance.

In the future, as emerging technologies like big data and AI rapidly evolve, city hotlines will be able to conduct more in-depth mining, broaden the scope, and refine the precision in analyzing hotline data. For example, by improving data-sharing capabilities, hotlines can gradually and selectively open their data, allowing research institutions, universities and experts to easily access and use hotline data. This will further promote data application and the scientific governance of cities. Additionally, hotlines can enhance the perception of evolving situations, deeply analyze key and recurring problems, bottlenecks and challenges from multiple perspectives, and fully tap into the valuable information hidden within the data. Work should be done to strengthen hotlines' risk-warning capabilities by shifting the focus from the whole city to specific neighborhoods, thereby identifying the connections behind different citizens' complaints, proactively managing public sentiment and enabling dynamic urban governance. Furthermore, to optimize decision-making support, hotlines should transform from reactive call centers to proactive problem-solving platforms and from providing public services to boosting data governance through data mining and precise analysis. This will allow hotline data to shift from simply being seen to actually being used, truly realizing its value in grassroots governance and scientific decision-making.

V. Greater Focus on Citizens' Feelings: Practicing Proactive Governance by Addressing Issues Before They Are Raised [77]

"To accomplish great things, one must always put the people first." Meeting citizens' growing needs for a better life is the core function of city hotlines and also a fundamental part of urban governance. Crucial challenges for the development of global city hotlines today are how to further enhance citizens' participation in urban governance, increase their satisfaction with public services, focus more on citizens' real experiences and improve the interaction with the public. It is also crucial to realize the shift from "promptly responding to complaints" to "addressing issues before they are raised," and from reactive responses to proactive governance. Based on assessment results and case studies, the research team believes that the principle of putting the people first offers valuable insights and solutions for the development of global city hotlines.

Enhancing traceability-based duty performance is an effective way for city hotlines to implement the people-first principle. An ideal societal operation means reducing the demand for hotline services to a minimum. The ultimate goal of city hotlines is to prevent risks and solve problems at the source, enabling the city to operate efficiently and predict citizens' needs precisely. Some city hotlines have already started using smart applications and data analysis tools to conduct in-depth research and systemic studies, focusing on citizens' immediate interests and the root causes of their concerns. By drawing inferences and addressing both the symptoms and the underlying causes, the cities have shifted from solving isolated cases to addressing broader systemic problems, thus implementing targeted measures to resolve complex issues.

Building a proactive governance model is a key measure for city hotlines to implement the people-first philosophy. China's "hotline + grid" dual-integration governance model offers a reference for global cities to practice proactive governance. This model focuses on citizens' interests, relies on high-frequency hotline requests, and uses grid service management as a tool to identify, understand and address issues before they are raised. In the future, global city hotlines will need to refine this model with more robust mechanisms, consolidating and promoting existing proactive governance practices. At the same time, they should strengthen the proactive role of the supply side, enhance interactions with the demand side, and transform city hotlines from "post-event management" and "reactive responses" to "pre-event management" and "proactive responses." This shift will improve the agility, effectiveness and foresight of hotline governance.

Creating an inclusive service system is a concrete manifestation of the people-first principle. As city hotlines become more widespread and cover more people, urban residents' awareness and demand are growing. Hotline management agencies must fully consider the diverse needs of different groups, focusing on aspects such as multilingual services, senior-friendly services and barrier-free access. By offering a variety of personalized and distinctive services and ensuring tailored, precise and prompt services, city hotlines can truly implement people-centered urban governance.

Epilogue

With the same level of meticulous precision as a painter creating a delicate painting, government service hotlines have depicted profound themes with vibrant colors.

This is a vivid portrayal that accurately captures the essential role of hotlines in today's cities around the globe.

Far from being mere channels for addressing complaints and venting emotions, hotlines have evolved into critical tools for modernizing the system and capacity for urban governance. In cities like Beijing, hotlines have become effective vehicles for engaging diverse stakeholders in social governance and for implementing a people-centered approach to urban governance.

Hotlines embody citizens' aspirations for a better life, their desire to participate in social governance, and their hopes for creating pleasant living environments. This assessment of Worldwide City Hotline Services and governance effectiveness aims to strike a balance between the challenges of hotline transformation and the growing expectations of citizens. It also seeks to explore new pathways, develop effective solutions, and provide answers that will contribute to the innovative development and upgrading of city hotlines worldwide.

The fundamental goal of urban governance is to enhance the people's sense of fulfillment, happiness and security.

It is hoped that the global hotline community will work together to promote more diverse hotline development, more refined urban governance, and broader citizen participation. By integrating whole-process people's democracy into the modernization of urban governance, we can build a community of urban governance where everyone participates, takes responsibility, contributes, and shares the benefits.

Research Team for the Evaluation on Worldwide City Hotline Services and Governance Effectiveness [7]

Leader: Pan Haiping

Deputy Leader: Meng Tianguang

Members: Yang Guang, Zhao Juan, Wan Li, Wang Meng, Han Xiannan, Cui Mingming, Zhong Pei, Xu Kaiyue, Jin Weiling, Yan Yu, Li Junjie, Wang Tingting, Zhao Jinxu, Du Yuchun, Fan Yunbo, Chen Xuexin, Wang Junlu

Expert Panel for the Evaluation on Worldwide City Hotline Services and Governance Effectiveness [7]

Chair of the Expert Panel:

Meng Tianguang, tenured professor, Party secretary of the School of Social Sciences, and deputy director of the Laboratory for Computational Social Science and State Governance at Tsinghua University

Vice Chairs of the Expert Panel:

Yan Jie, professor and vice dean of the School of Government at Peking University

Zheng Jianjun, researcher at the Institute of Political Science under the Chinese Academy of Social Sciences and professor at the School of Government under the University of Chinese Academy of Social Sciences

Members of the Expert Panel (Listed Alphabetically by Surname):

Huang Huang, professor and vice dean of the School of Government at Peking University

Ma Liang, professor of the School of Public Administration and Policy at Renmin University of China

Sun Yanping, Chinese director of PUC-Rio Confucius Institute

Sun Zongfeng, professor and vice dean of the School of Political Science and Public Administration at Shandong University

Tan Ankui, professor and dean of the School of Government at Sun Yat-sen University

Wang Yukai, professor at the Party School of the Central Committee of the Communist Party of China (National Academy of Governance) and deputy director of the academic committee of the China Society of Administrative Reform

Yuan Zhenlong, researcher at the Beijing Academy of Social Sciences and director of the academy's comprehensive governance institute

Zhang Xiaojin, tenured professor and director of the Center on Data and Governance at Tsinghua University

Zhang Xinliang, director of the governance research office of the evaluation institute at the China National Institute of Standardization

Zheng Yueping, associate professor of the School of Government at Sun Yat-sen University and director of the Center for Digital Governance under Sun Yat-sen University

Alfred Tat-Kei Ho, professor of the Department of Public and International Affairs, dean of the College of Liberal Arts & Social Sciences at City University of Hong Kong and fellow of the U.S. National Academy of Public Administration

Marc Holzer, fellow of the U.S. National Academy of Public Administration and former president of the American Society for Public Administration

Ichiro Kawashima, deputy director of the Tsinghua-NRI China Research Center

Margarethe Theseira, professor at the Bartlett Department Planning Unit, University College London

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