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A Service-Oriented and Informatics-Based Mobile E-Government System for Public Crisis Management

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Abstract. This study constructs a service-oriented mobile e-government system grounded in informatics principles to enhance public crisis management. Framed within service systems theory, the research conceptualizes crisis response as a logistics-coordinated service process. The proposed system integrates Internet of Things sensing, real-time data analytics, and mobile communication to form an informatics architecture supporting information flow, resource allocation, and decision support. A four-layer system design encompassing data acquisition, processing, service application, and user interaction is detailed. The system's performance was evaluated through test experiments simulating environmental and public health crises, focusing on response time, data accuracy, and logistics coordination efficiency. Results indicate a 56.87% improvement in processing efficiency compared to traditional methods, demonstrating enhanced service responsiveness. The study contributes an integrated informatics architecture for crisis management and provides empirical evidence on its efficacy in improving information quality and logistics coordination within public service systems.

Keywords: Public Crisis, Mobile E-government, Crisis Management, Intelligent Internet of Things

1. Introduction

Despite a global context of peace and development, public crises persistently occur. From a national perspective, frequent occurrences include trade conflicts, diplomatic crises, and financial crises, with some regions experiencing ongoing conflict. From a social perspective, public crisis events such as environmental pollution, natural disasters, public health crises and public equipment failures are also common (Moloney and Krislov, 2016). For the people, these crises directly or indirectly affect people's real interests and life safety from various fields (Zhou and Segerson, 2016). The proliferation of mobile Internet is rapidly shifting government operations towards mobile platforms. For example, Htun investigated the attrition rate of teaching staff in Myanmar Medical University from 2009 to 2013 through the administrative records of the e-government system of the Ministry of Health of the Ministry of Health of Myanmar, and then studied the lack of health human resources in Myanmar (Htun et al., 2016). The survey found that the loss of health human resources in Myanmar is mainly divided into two types: involuntary attrition, ie death or retirement, and voluntary attrition, ie resignation or absenteeism. The annual attrition rate of various health workers is about 4%, of which most employees leave involuntarily attrition. Up to 357 employees, accounting for 72.3% of the resigned employees (Tokakis et al., 2018). However, mobile e-government is still not popularized and perfected in many areas. Therefore, the construction of mobile e-government system has important research significance and broad application prospects for the development of public crisis management. The theoretical foundation of this research is grounded in Service Systems Theory and Information Processing Theory. Service Systems Theory frames public crisis management as a complex service system where government entities, citizens, information, and technology interact to co-create value during crises. Information Processing Theory explains how the proposed intelligent mobile e-government system reduces uncertainty and enhances decision-making quality by improving the acquisition, processing, and dissemination of crisis-related information. This theoretical framework provides a basis for understanding how the integration of mobile technology and IoT data improves service efficiency, information quality, and inter-organizational coordination in crisis logistics and response.

Public crisis management critically impacts national, societal, and individual interests, including safety. Substantial research exists on public crisis management both domestically and internationally. For example, Guan P developed a PPP-based disaster management system through the game model and the social planner model for the situation that government agencies cannot handle alone when responding to disasters in densely populated areas (Guan and Zhuang, 2017). The results show that the PPP-based disaster management system can improve the quality of service provided by the government to citizens and organizations to effectively manage environmental issues. Chung C examines the role of institutions in explaining the choice of entry methods for enterprises in transition economies, and proposes an international business strategy process model based on interactive institutions (Chung et al., 2016). The results show that the institutional pressure exerted by the home country government has a significant impact on the foreign direct investment ownership decision. Therefore, companies facing greater institutional pressure are more inclined to choose foreign international joint ventures rather than wholly-owned foreign subsidiaries. Yu L discussed the crisis information release strategy used by mass media to control public panic caused by emergencies, and proposed a multi-agent-based simulation model (Yu et al., 2017). Through the analysis of four typical cases of dangerous chemicals leaking into rivers in China, it is found that when emergencies occur, the mass media plays a vital role in guiding public panic by expanding the speed and scope of online public opinion dissemination. In order to assess the health of the population and track changes over time, Wang F proposed the concept of "utility-adjusted lifespan", which adjusts lifespan through a more comprehensive utility measurement combined with utility. Survival functions come from consumption and health (Wang and Wang, 2017).

In foreign countries, governments of various countries also pay great attention to the research of public crisis management. Bernardo combined mobile communication technology to establish a systematic rescue strategy model, which shows how the government designs tax-funded corporate rescue programs to rescue failed marginal companies (Bernardo et al., 2016). Research shows that the bailout plan with minimal distortion depends to a large extent on the government's ability to deprive shareholders and fire managers. Athanasiou developed a Web-based geographic information system based on the mapping technology and database technology of the Web-based GIS system and Web applications (Athanasiou et al., 2018). The results show that the system enhances the knowledge of local governments and relevant stakeholders to improve decision-making processes and effective crisis management in the event of a flood. Makinen discussed the challenge of the main framework of politics and corporate social responsibility to the traditional economic concepts of enterprises (Makinen and Kasanen, 2016). The research shows a paradigm shift in the main framework of political corporate social responsibility, taking into account strict international laws and ethical regulations, and the need for the boundary between business and politics. Evelyn investigated several hypotheses about the driving factors of large-scale public crises and compared them with Eurosceptic analysis (Evelyn, 2018). Existing studies mainly focus on fragmented technologies or specific regional policies. Comprehensive mobile platforms integrating real-time sensing data and automated decision-making processes remain scarce. The integration mechanism between Internet of Things sensing networks and emergency logistics coordination lacks deep empirical validation. This study constructs a service-oriented mobile e-government system grounded in informatics principles to enhance public crisis management. The proposed architecture directly connects the data acquisition layer and the service application layer to optimize information flow. The research evaluates the system performance in simulating environmental and public health crises to verify the efficiency improvement.

This research identifies primary public crisis types and current management practices through literature review. According to the survey results, we have a deep understanding of public crisis management such as environmental pollution, natural disasters, public health crises, public equipment failures, and emergency crisis events. Content and form (Hanson, 2015). This research aims to build a smart mobile e-government system for public crisis management through the Internet of Things and mobile e-government applications, so as to improve the quality of corresponding services provided by government departments for public crisis events and the efficiency of government affairs processing, and can further improve the government's Credibility (Avery et al., 2016). This research uses the smart sensor technology of the Internet of Things and the Internet mobile communication technology to monitor and collect public crisis event information in real time, and build a mobile e-government system platform for government personnel to coordinate and manage the development of public crises more conveniently and quickly (Galaz et al., 2016; Smolentseva, 2017). In the design process of mobile e-government system, this paper determines the functional requirements of the system and designs corresponding functional modules based on the literature survey, and then collects crisis event data through satellite monitoring, news media, smart sensors, and monitoring technology.

This study makes three primary contributions. First, it proposes a novel, integrated informatics architecture that cohesively combines IoT-based real-time monitoring, mobile service delivery, and data-driven decision support into a unified platform for crisis management, distinguishing it from earlier systems that often addressed these components in isolation. Second, it provides an empirical evaluation of the system's impact on service process efficiency and information quality within the context of public crisis management, offering quantitative evidence beyond conceptual design. Third, it articulates and applies a service systems lens to crisis management, explicitly linking the technical design of the e-government system to improvements in logistics coordination and service outcomes.

2. Public Crisis Information Data Collection and Processing Methods

2.1 Environmental Pollution Monitoring and Data Collection

The informatics approach of this system is integrated rather than fragmented. Sensing technologies provide real-time data inputs. Spatial-temporal and Bayesian classification algorithms process this raw data into structured, prioritized crisis information. This processed intelligence feeds into visualization dashboards and decision-support modules within the mobile application. This coherent pipeline—from sensing to analytics to actionable service interfaces—forms the core informatics logic that enables timely situation awareness and supports coordinated crisis response decisions by government personnel.

Public crisis events are frequent and diverse. This paper takes the intelligent detection and data collection of environmental pollution and public health crisis information as an example to introduce the public crisis data collection method of the mobile e-government system in this study. At present, there are very mature IoT monitoring technologies for the detection of environmental pollution. For example, the real-time detection and data collection of air pollution are achieved through the combination of ground-based smart sensors and remote sensing satellite technology (Okulicz-Kozaryn and Mazelis, 2017; Splinter, 2017). This paper uses a spatial-temporal geographic weighted regression model to monitor the concentration of atmospheric pollutants such as PM2.5 and PM10 in the atmosphere and the harm they cause. The model reflects the monitoring situation and prediction accuracy of air pollution through four statistical indicators: mean square error, average absolute error, root mean square error, and average absolute percentage error. Taking PM2.5 as an example, the calculation formula for the mean square error MSE between the actual value of the PM2.5 concentration detected by the ground smart sensor and the observation value of the remote sensing satellite is as follows.

$$MSE = 1 - \frac{\sum_{i=1}^{n}(PM_{2.5}^{obs} - PM_{2.5}^{sim})^2}{\sum_{i=1}^{n}(PM_{2.5}^{obs} - P\bar{M}_{2.5}^{obs})^2} \quad (1)$$

The calculation of the mean square error in formula (1) is to correct the PM2.5 concentration value monitored by the satellite, where $PM_{2.5}^{obs}$ represents the actual value of PM2.5 concentration detected by the smart sensor at the ground sample point location, and $P\bar{M}_{2.5}^{obs}$ represents the average value detected by the ground sensor. The calculation formula of the root mean square error $RMSE$ is as follows.

$$RMSE = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(PM_{2.5}^{obs} - PM_{2.5}^{sim})^2} \quad (2)$$

The root mean square error in formula (2) measures the difference between the ground smart sensor detection value and the satellite simulation value. This statistical indicator is very sensitive to both systematic and random errors. The average absolute error MAE measures the magnitude of the average error of the sample data points, and its calculation formula is shown below.

$$MAE = \frac{1}{n}\sum_{i=1}^{n}\left|PM_{2.5}^{obs} - PM_{2.5}^{sim}\right| \quad (3)$$

According to the principle of the average absolute error, the average absolute percentage error $MAPE$ can be further obtained. The average absolute percentage error is based on the average absolute error and uses the form of percentage to reflect the simulation accuracy of the geographically weighted regression model for sample data points as follows.

$$MAPE = \frac{100\sum_{i=1}^{n}\left|(PM_{2.5}^{obs} - PM_{2.5}^{sim})/PM_{2.5}^{obs}\right|}{n} \quad (4)$$

2.2 Public Health Intelligent Surveillance Technology

The mobile e-government system requires real-time positioning and tracking for crisis data collection. This is widely used in public health surveillance and police systems. This article takes public health surveillance as an example to analyze the principles of intelligent surveillance technology used in the collection of crisis information. Generally speaking, target positioning and tracking methods are realized by establishing tracking models (Mukwaya, 2016; Ismailova, 2017). If the target moves in a straight line in the area, a positioning algorithm based on RSSI ranging can be used, which can establish a gradual model of signal strength and distance.

$$y(d) = y(d_0) - 10m\,log(\,d/d_0) \quad (5)$$

As shown in formula (5), d_0 represents the reference distance, which is usually set to 1 meter for the convenience of calculation, d represents the distance between the sensor transmitting the signal and the signal receiving end, $y(d)$ and $y(d_0)$ represent the signal position and receiving signal of the sensor respectively The signal strength when the distance between the position and the reference distance and the distance between the sensor and the receiving signal end are consistent. m is the weakening index of the signal from sending to receiving. The longer the distance, the weaker the signal, and the larger the corresponding value. If the target is moving in a uniform straight line, the target tracking and simulation motion model can be established according to the principle of unscented Kalman filter (Ismailova, 2017; Enderle, 2018). As shown in formula (6), where Φ and Γ represent the coefficient matrix and the Lagrangian parameter matrix, respectively, the mean square error of $u(m)$ and $v(m)$ are the matrix determinant value and the order of the coefficient matrix, respectively. $Y(m)$ and $Z(m)$ are the spatial variable model functions of the target movement.

$$\begin{cases} Y(m) = \Phi Y(m-1) + \Gamma u(m) \\ Z(m) = \sqrt{(x_m - x_0)^2 + (y_m - y_0)^2} + v(m) \end{cases} \tag{6}$$

In addition to location tracking and detection, the collection of public health crisis information also relies on the application of intelligent surveillance technology, of which the most important application is intelligent image recognition. In particular, image recognition technologies such as face recognition have vital applications in public health situation detection and police systems. This article analyzes the algorithms and principles of current image intelligent recognition technology by taking hygienic monitoring in public places as an example.

2.3 Public Crisis Data Classification Algorithm

To conserve resources and time, crisis data from sensors and the internet requires classification before presentation to government staff via the mobile system for rapid management. This aligns with emerging insights on how artificial intelligence enables agile governance in mobilization economies, where rapid data-driven coordination becomes a strategic imperative (Čyras and Nalivaikė, 2024). The classification algorithms commonly used in various system platforms include decision trees, Bayesian classification, artificial neural networks and other algorithms. This article mainly uses Bayesian classification algorithms. Its main principle is to classify data through related association rules and probability distributions.

$$p(X_k|Y) = \frac{p(X_k)p(Y|X_k)}{p(Y)} = \frac{p(X_k)p(Y|X_k)}{\sum_{i=1}^{n} p(X_i)p(Y|X_i)} \tag{7}$$

Formula (7) is the Bayesian conditional probability formula, which expresses the probability that the occurrence of event Y is caused by the k -th condition. The parameter estimation method used in this article is still Bayesian estimation. In the collected public crisis data, there are both discrete sample data and continuous data. For discrete sample data, according to the probability of each part obtained by Bayesian formula, the likelihood function of parameter θ can be obtained as follows.

$$L(\theta) = L(x_1, \dots. x_n; \theta) = \prod_{i=1}^{n} p(x_i; \theta) \tag{8}$$

Formula (8) can also express the joint distribution law of the sample population with the sample size n. For continuous random variable data, the likelihood function of parameter θ is similar to this. The right side of the equation is the joint probability density function of the sample, and its likelihood function is as follows.

$$L(\theta) = L(x_1, \dots. x_n; \theta) = \prod_{i=1}^{n} f(x_i; \theta) \tag{9}$$

In parameter estimation, according to the needs of actual problems, sometimes the value of the parameter is not estimated directly, but it is assumed that the parameter obeys a certain distribution and in turn estimates the probability of the value of one of the conditions x. This is Bayesian estimation, and its calculation formula as follows.

$$p(\hat{x}|X) = \int_{\theta \in \square} p(\hat{x}|\theta)p(\theta|X)d\theta = \int_{\theta \in \square} \frac{p(\hat{x}|\theta)p(\theta)p(X|\theta)}{p(X)} d\theta \tag{10}$$

According to the requirements of the mobile e-government system, this paper chooses the Bayesian classification algorithm to classify the data collected by the Internet of Things. In order to analyze the performance of Bayesian classification algorithms, this paper also investigates the performance of other classification algorithms. As shown in Table 1, this paper compares the decision tree algorithm (DT), Bayesian classification algorithm (NBC), regression algorithm (LR), support vector machine algorithm (SVM), K nearest neighbor algorithm (KNN) and artificial neural network (ANN) and other algorithms' fitness, classification time, sensitivity, training data volume performance (Carnall et al., 2016; Víctor, 2016).

Table 1. Performance comparison of machine classification algorithms

Algorithm	Convergence time	Fit degree	Sensitivity	Training data volume
DT	Slow	Not excessive	Not sensitive	Small amount
LR	Fast	Over	Sensitive	No request
SVM	General	Over	Sensitive	Small amount
NBC	Fast	Over	Sensitive	No request
KNN	Fast	Over	Not sensitive	Large amount
ANN	Slow	Over	Sensitive	Large amount

2.4 Public Health Crisis Data Processing

Public health crises arise from multiple factors, notably including medical resource loss due to environmental pollution and remediation efforts. This article counts the harm caused by several important factors of the public health crisis based on relevant research (Ullah, 2017; Kotzee and Reyers, 2016). The medical resource loss data can be calculated and processed by the following formula.

$$C_m = \frac{t}{365}(PX_0 - X_0Y_0) - (PX_1 - X_1Y_1) \quad (11)$$

In formula (11), C_m represents the loss of medical resources during the public health crisis, P represents the market price of medical resources, X_0 and X_1 represent the average annual output of certain types of medical supplies before and after the public health crisis, and Y_0 and Y_1 represent the The production cost of similar medical supplies. Similarly, the loss of water supply can be calculated by the following formula.

$$C_w = R \times Q \times T \times (P_1 - P_0) \quad (12)$$

In formula (12), C_w represents the loss of water supply in the public health crisis, R represents the pure water supply in the public crisis, S represents the area of water polluted by the public health environment, and T represents time of the water resources affected by the public health environmental pollution. P_0 and P_1 respectively represent the cost of water withdrawal including water treatment before and after the public health crisis. The same space resource crisis can be expressed as follows.

$$C_s = \frac{t}{365} P_i \times Q_i \times R_i \quad (13)$$

In formula (13), C_s represents the space resource crisis in the public health crisis, such as insufficient medical space during the epidemic. P_i represents the crisis and loss caused by the public health crisis to the living space environment, Q_i represents the value yield rate of space resources, and R_i represents the space utilization rate before the public health crisis. In addition, the waste disposal loss in the public health crisis is expressed as follows.

$$C_g = \frac{t}{365} \times P \times Q \quad (14)$$

In formula (14), C_g represents the value of the loss caused by the waste disposal service function in the public health crisis, P represents the unit cost of waste disposal, and Q represents the amount of waste that enters the ocean, rivers and buried in the soil during the public health crisis.

3. Public Crisis Intelligent Mobile E-government System Test Experiment

3.1 Experimental Objects and Test Environment

The system architecture is designed with four distinct layers to ensure clarity in data flow and module interaction. The Data Acquisition Layer comprises IoT sensors and satellites for real-time monitoring. The Data Processing and Storage Layer utilizes cloud infrastructure, where data is cleaned, classified using the Bayesian algorithm, and stored. The Application Service Layer hosts the core functional modules for crisis classification, resource dispatch, and public communication. The User Interaction Layer provides a unified mobile and web interface for government staff and citizens. Information flows bidirectionally: from sensors through processing modules to decision-support dashboards, and from user inputs back to the coordination modules, enabling closed-loop crisis management. This paper focuses on constructing an intelligent mobile e-government system for public crisis management. According to the case of related public crisis management, first analyze the functional requirements of the government system platform for public crisis management, and then build an intelligent mobile e-government system through mobile communication technology. Public crisis management is critically linked to individual well-being and safety. At present, the state's public crisis management system and assistance services provided are very sound. Therefore, according to the needs of public crisis management, this article sets different permissions according to different user types during the design of the mobile e-government system, and sorts and sorts crisis events according to their importance, so that the people can understand in time and the government departments can efficiently manage. To test system function and efficiency, this study designs test cases using environmental pollution and public health crisis examples. The test environment only needs to log in to the system through a browser on the PC side that keeps the network open.

The evaluation methodology employed a controlled test design. A simulated dataset encompassing 500 crisis event records for environmental pollution and 500 records for public health crises was constructed, derived from historical data and IoT sensor simulations. The baseline for comparison was a documented traditional paper-based and fragmented digital workflow used in prior crisis responses. Performance metrics included system response time, data classification accuracy, and time-to-decisions for resource dispatch. The reported 56.87% efficiency improvement was calculated as the relative reduction in average end-to-end processing time per crisis event, from initial data ingestion to coordinated response initiation, between the proposed system and the baseline method. Statistical significance was assessed using the independent sample T-test reported in Section 3.3.

3.2 Experimental Process and Use Case Design

This experiment tests system functions including user authority management, crisis information classification, and priority information release. The experiment is mainly divided into the following steps. First, conduct demand analysis and feasibility analysis through literature research to determine the functions that the system needs to achieve and whether the existing technology can be achieved. Second, design various functional modules according to the requirements of public announcement crisis management, and determine the overall framework of the system. Third, use relevant communication technology to implement the system and test the safety performance of the system. Finally, according to environmental pollution and public health crisis events, test cases are designed for system testing. The overall framework of the intelligent mobile e-government system is shown in Figure 1.

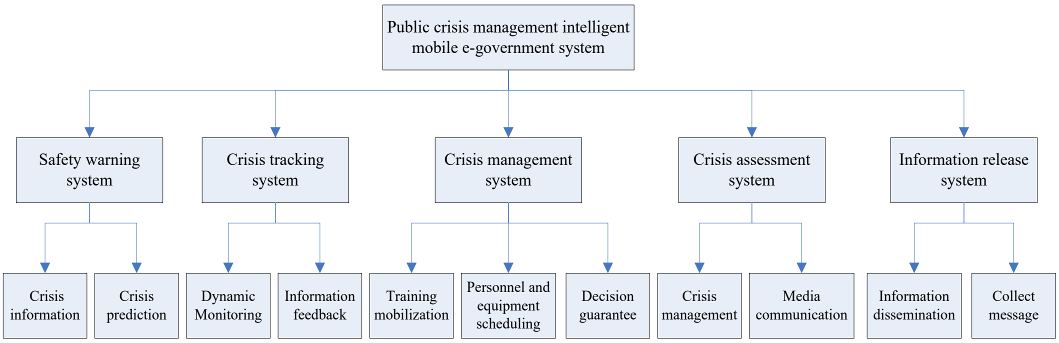

Fig.1. Framework structure of public crisis management mobile e-government system

3.3 Data Processing and Error Analysis

The experiment analyzes correlations between variables in crisis data. Commonly used methods are unary regression and multiple regression analysis methods, which are statistical analysis methods used to determine the quantitative relationship between two or more variables. The statistical analysis shows that the calculation formula of sample variance S and statistic F is as shown in (15), where λ is a constant, μ is the partial regression coefficient of the dependent variable y_i corresponding to the independent variable x_i, and v_i is the error of the dependent variable.

$$S = \sqrt{\frac{1}{n-2}\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}\,,\ F = (n-2)\frac{\sum_{i=1}^{n}(y_i-\hat{y}_i)^2}{\sum_{i=1}^{n}(y_i-\bar{y}_i)^2} \qquad (15)$$

For the public crisis management performance of the intelligent mobile e-government system, this paper also uses the independent sample T test method to verify. The experimental T test method is mainly determined by independent sample mean $\bar{X}$, sample population mean μ and sample standard deviation S. The calculation formula of the test statistic T is shown in formula (16), where γ represents the degree of freedom, n represents the number of samples to be tested, and N represents the number of samples in the population.

$$T = \frac{\bar{X}-\mu}{S_{\bar{X}}} = \frac{\bar{X}-\mu}{S/\sqrt{N}}, \gamma = n-1 \qquad (16)$$

4. Discussion on Test Experiment of Public Crisis Mobile E-government System

4.1 Mobile Information Technology Application Analysis

Compared to robust mobile e-commerce development, mobile information technology application in Chinese e-government remains nascent in depth and breadth. As shown in Table 2, the year-on-year growth rate of Chinese citizens using mobile phones to access the Internet in 2018 reached 61.5%, among which third-tier cities generally use mobile phones to access the Internet. The survey data on Internet usage penetration across city tiers (Table 2) and netizen income distribution (Table 3) were sourced from the annual statistical reports published by the China Internet Network Information Center. The data on government credibility and the Credit Well-off Index (Table 5) were obtained from the yearly survey reports conducted by China Well-off Magazine. These are nationally recognized secondary data sources. The system performance data (Table 4, Figure 4) were generated from our controlled test experiments using the simulated crisis datasets described in Section 3.1.

Table 2. Proportion of using mobile phones to go online in each tier city

Statistical year	First line (%)	Second line (%)	Third line (%)	Total (%)
2013	34.1	18.8	35.3	27.6
2014	32.4	27.1	39.3	33.4
2015	36.1	33.8	45.4	37.6

2016	43.6	37.9	51.3	44.8
2017	54.5	46.7	59.7	51.7
2018	61.3	53.6	67.6	61.5

According to a survey on the application of mobile information technology, this article found that most of these netizen use mobile networks for mobile e-commerce and understanding entertainment news and other media information, and they are rarely used in mobile e-government. This is also one of the problems currently encountered in the development of mobile e-government. Figure 2 shows the growth rate of Internet users in various tier cities in China from 2012 to 2018.

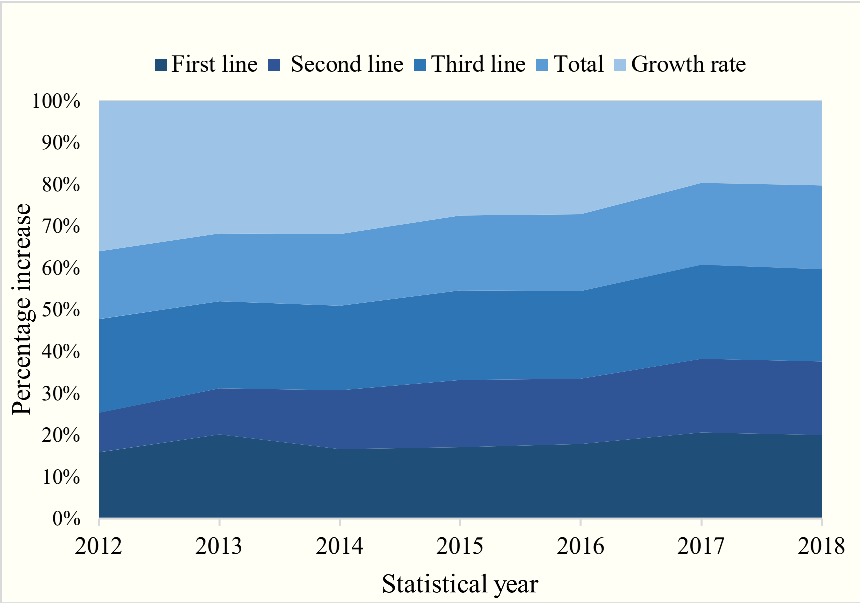

Fig.2: Growth rate of Internet users using mobile phones in each tier city

4.2 Survey on the Current Situation of Public Crisis Management

According to the survey, the development of mobile e-government is largely affected by the traffic charges of mobile operators. In particular, real-time dynamic tracking of public crisis management not only requires a smooth and good network, but also a large burden on traffic.. In addition, the grades of mobile devices and the uneven distribution of user income have a hidden impact on the quality of my country's mobile e-government development. This paper investigates the monthly income levels of mobile phone netizen, PC netizen, PDA netizen and overall netizen as shown in Table 3.

Table 3. Proportion of income of Chinese Internet users at various stages

Netizen income	Phone (%)	PC (%)	PDA (%)	Total (%)
No income	7.9	4.3	4.9	9.2
Below 1000	10.2	5.2	5.8	10.6
1000-2000	8.4	6.4	7.5	9.3
2000-3000	9.5	5.9	6.7	9.8
3000-5000	28.7	27.4	31.9	22.1
5000-8000	22.8	30.2	24.1	27.4
8000-10000	7.9	11.2	10.7	7.3
10000 and above	4.6	9.4	8.3	4.5

As shown in Figure 3, the proportion of mobile phone netizen with monthly income above 3,000 yuan and below 8,000 yuan is higher than the proportion of overall netizen in this range, followed by mobile phone netizen with monthly income below 2,000 yuan. Obviously, income restrictions and mobile operators' charges have largely affected the development of mobile e-government.

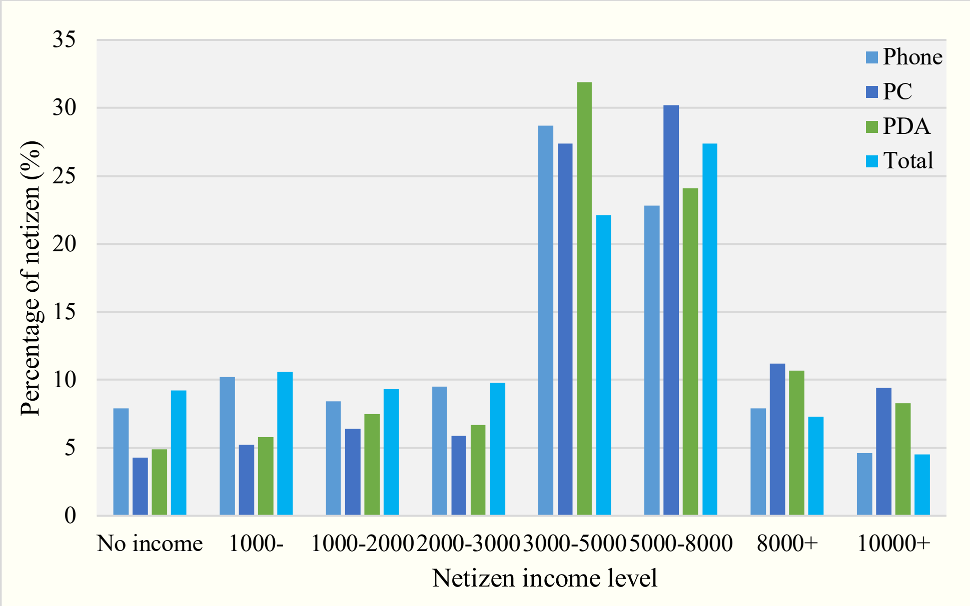

Fig.3: Income level and proportion of Chinese Internet users

4.3 Function Test of Mobile E-government System

According to the system testing principle and the functional requirements of the mobile e-government system, this paper conducts a system function test on the established mobile e-government system. Testing is mainly divided into two aspects, namely functional testing and safety testing. These two kinds of tests can be tested through major operations such as registration, login, process query, information submission and preservation, and crisis management. The minimum response time Min-RT, average response time Ave-RT, maximum response time Max-RT of the system test results, as well as the degree of data missing and the accuracy of crisis information classification are shown in Table 4.

Table 4. System test of each function operation of mobile e-government system

Operation	Min-RT(s)	Ave-RT(s)	Max-RT(s)	Missing(%)	Accuracy(%)
Registered	0.19	3.14	11.24	23.54	78.65
Login	0.21	3.02	10.68	19.86	83.47
Process query	0.14	2.33	13.52	26.37	69.84
Submit to save	0.23	4.32	14.56	21.53	74.36
Crisis management	0.28	2.56	13.87	28.79	66.93

In the process of system testing, the functional operations of all mobile e-government systems successfully passed the test, but there were some problems that did not affect the realization of system functions in the steps of passing the test. This paper found that there are 8 operation steps in question. The system explicitly supports emergency logistics functions through dedicated modules. A Resource Scheduling Module dynamically maps available personnel, equipment, and materials against crisis epicenters using real-time GIS data. An Inter-departmental Coordination Module provides a shared operational picture and communication channel, breaking down information silos between agencies like health, environment, and civil defense. The system enables real-time allocation by processing logistics data, such as resource proximity and urgency levels, thereby reducing mobilization time and optimizing the distribution of critical assets during a crisis. The minimum response time, average response time, maximum response time, data missing degree and accuracy of crisis information classification of these operation steps are shown in Figure 4. Based on this, this article quickly modified these problematic modules to meet the security and stability requirements of the system.

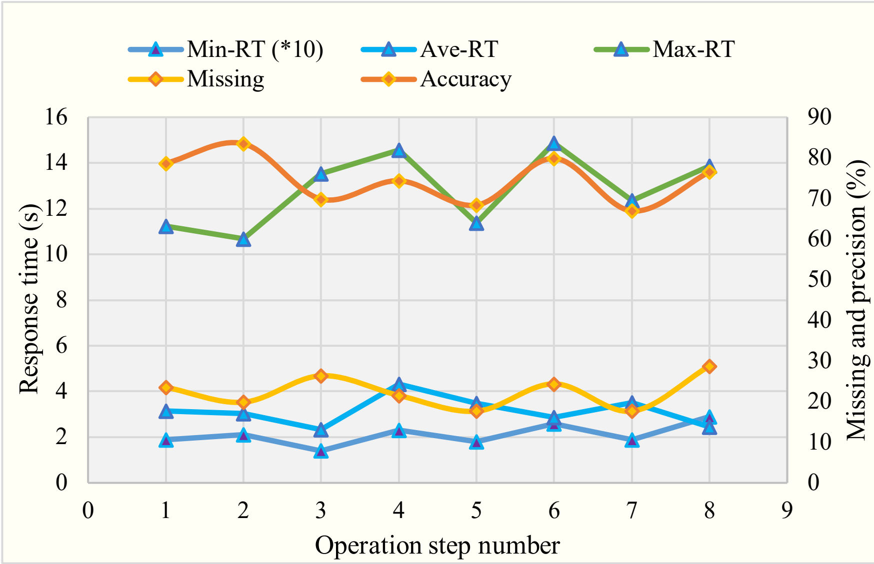

Fig.4: System test situation of mobile e-government system operation

4.4 Research on Government's Credibility in Public Crisis Management

The first priority in the management of public crises is credibility. Only with a high degree of credibility can the government quickly dispatch human and material resources and work with the people to cope with public crises. According to the survey of government credibility conducted by China Well-off Magazine, the statistical results show that government credibility is the most popular among the public in the field of social credit. This paper conducts a survey and research on China's credit well-off index, corporate credit, interpersonal credit, government credibility, and credibility weight. The results are shown in Table 5.

Table 5. Credit well-off index and government credibility survey in recent years

Statistical year	Credit Well-off Index	Corporate credit	Interpersonal credit	Government credibility	Credibility weight
2012	62.6	54.9	68.2	65.3	41.6
2013	64.3	56.2	68.7	67.4	45.7
2014	66.7	58.5	70.2	69.8	43.9
2015	70.4	67.6	67.8	74.1	48.8
2016	72.7	68.4	66.7	77.9	46.7
2017	74.1	70.6	68.7	81.2	50.4
2018	78.7	74.6	73.5	84.6	54.6

In recent years, the changes in the Chinese government's credibility and other credit index survey results are shown in Figure 5. From the comparison of the weights of government credibility, interpersonal credit, and corporate credit, the proportion of government credit is 54.6%, which fully reflects the primacy of government credibility in the credit field. At the same time, the improvement of government credibility is also very effective in public crisis management.

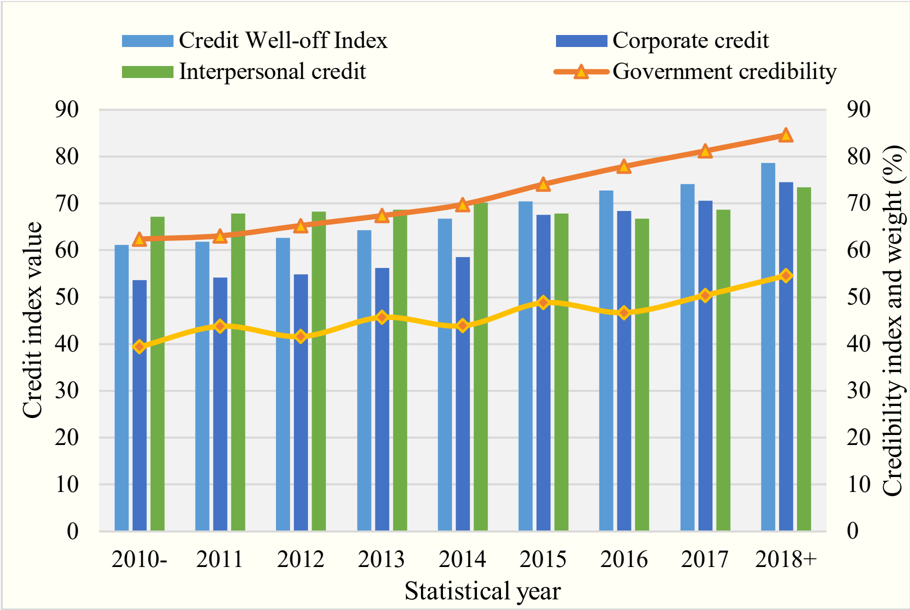

Fig.5: Credit well-off index and changes in government credibility

4.5 People's Attitudes and Evaluations on Mobile E-government System

To gauge public acceptance, this study surveyed public attention to crisis management and willingness to use the mobile e-government system. The results of the survey are shown in Table 6, where the public's attention to the mobile e-government system is divided into non-attention, understanding, influential, great attention and active dissemination. The intention to use is divided into A does not care, B is unique to the government, C does not believe, D cannot bear the cost of use, and E often pays attention and uses.

Table 6. Concerns about public crisis management and the use of mobile e-government systems

Attention	A	B	C	D	E
Not concerned	57	112	79	68	73
Understanding	64	124	46	71	69
Influential	73	118	57	62	84
Important	56	106	64	84	78
Active communication	49	132	38	76	95

Based on the above investigations, this article further investigates the public's attention to public crisis management and changes in the willingness to use mobile e-government systems in recent years. As shown in Figure 6, the public's attention to public crisis management fluctuated frequently from 2012 to 2018, but the overall trend was still rising. As for the willingness to use the mobile e-government system, most people still think that it is only used by government departments alone, and some people express that they are unwilling to spend extra money to understand public crisis information through the mobile e-government system, and are more willing to use other Internet media pay attention to the dynamics of public crisis. However, crisis information learned through media and public opinion is likely to cause panic due to the presence of more false information, which is also one of the difficulties of e-government development. Therefore, incorporating an analysis and management mechanism for data uncertainty into system design is crucial for enhancing the reliability of public service decision-making. The findings demonstrate that the system enhances service efficiency by compressing the information processing cycle, which directly addresses uncertainty in crisis logistics. Improved information quality, evidenced by reduced data missing rates, supports more accurate resource coordination decisions. The system's architecture facilitates tighter coupling between information flow and material flow, a core tenet of service systems under stress. This integration mitigates coordination failures common in traditional crisis response, thereby strengthening the overall resilience of the public crisis management service system.

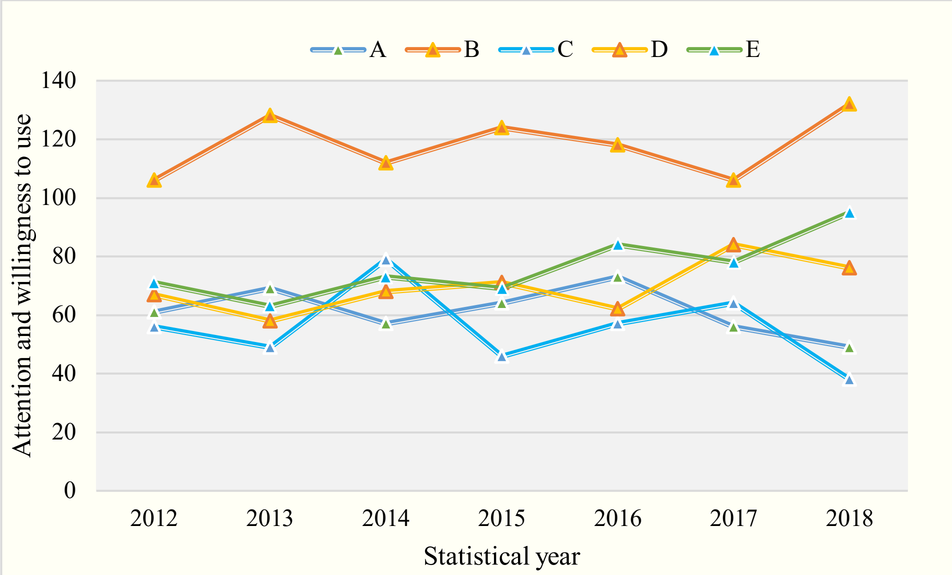

Fig.6: People’s attention to public crisis and willingness to use mobile e-government system

5. Managerial and Policy Implications

For government managers, the findings suggest prioritizing the deployment of the Resource Scheduling and Inter-departmental Coordination modules to achieve immediate logistical gains. Effective coordination across agencies often hinges on managing inter-organizational conflicts constructively; recent evidence shows that adaptive conflict management styles can significantly enhance organizational performance in high-stress contexts (Al and Dalati, 2025). Establishing clear data governance protocols for IoT sensor data is crucial for maintaining information quality. Policy should encourage the integration of this mobile platform into standard operating procedures for crisis response, mandating its use for situational reporting to centralize information flow (Ning and Dong, 2026). Training programs must be implemented to ensure personnel proficiency in using the decision-support features, moving beyond basic information dissemination to active logistics management. (Nguyen, 2026)

6. Conclusions

The study’s design and testing focused on environmental pollution and public health crises within a specific national context. The generalizability of the system architecture and core informatics principles—such as IoT integration, real-time data processing, and mobile service delivery—is considered applicable to other crisis types like natural disasters or infrastructure failures. However, successful deployment in other regions would require adaptation to local legal frameworks, telecommunications infrastructure, and institutional arrangements for crisis response. This research designed and tested a service-oriented mobile e-government system for public crisis management. The experimental results directly demonstrate that the system reduces information processing time and improves data accuracy for the tested crisis types. These technical improvements are inferred to support faster logistics coordination and resource allocation. The potential for enhancing government credibility stems from the increased transparency and responsiveness the system enables. Future work is needed to validate these broader benefits in operational settings and across a wider range of crises.

The following conclusions are drawn through experiments in this research, which are also the innovation and application value of this research. First of all, the intelligent mobile e-government system effectively improves the government’s management efficiency in responding to public crises, while saving management costs. You can understand and deal with public crisis events in real time through your smart phone. Secondly, it breaks the limitation of time and space, avoids the information dissemination time of sudden public crisis events, and saves more time for the government and relevant departments to carry out resource scheduling and crisis handling more calmly and orderly. Finally, the mobile government system can allow users to understand the development of public crises and important measures made by the government in real time through the setting of different permissions, and enhance the government's credibility and affinity for the people.

Due to the various types of public crisis events, this article only tests the functions of the mobile e-government system in this study through environmental pollution cases, so there are many imperfections in the construction of the government system in this study. In addition, limited by the author's understanding of communication technology, although this research has a thorough theoretical analysis of the government affairs system, the research on the realization of specific system functions is relatively simple. In the future, we hope that we can continuously verify and improve the functions of this system from more types of public crisis events, and learn in-depth knowledge of mobile communication technology from professionals to enrich the functions of the system.

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