Smarter Decision: an Intelligent Decision-Making Platform for City Mayor

WU Zhiqiang[1], XU Xingjing[2] and CAO Jing[3]

[1]Tongji University, wusres@163.com
[2]Shanghai Tongji Urban Planning and Design Institute, a_xuxinjing@hotmail.com
[3]College of Design and Innovation, Tongji University

Abstract:
Urban managers are eager to transform from tradition Empiricism mode to Rational urbanization, a vast amount of data is collected from aspects of urban planning, management and security. However, lack of connections between and effective mana categories of data leads to the phenomenon of data islands .

An intelligent smart city decision-making platform is structured on the base of an in and supported by ICTs. The platform addresses to the new demands of intelligent production in future urban China. Within the Chinese urban decision-making syste background of urbanization, this integrated supporting system will meet the need real-time decision transmission of decision-makers at all levels.

There are eight functional modules in support to intelligent decision-making. In information of the city and the visualized data analysis will serve decision-mak urban development. Also the indicators of the evaluation system can act as a dat The city-being sustainability-oriented indicator system is established as the so computation. Key data mining and the spatial visualization of data are applying operation data mining and display are conducted through diverse visualization to Model, a basis of advanced software platform, algorithms development and the urb Furthermore, rationalism decision-making is promoted to realize the new manageme decision-making.

Keywords: ICT, Decision Making, Rational Planning

1. Background Overview of the Intelligent Decision Support System

Decision-making has existed with the production and activities of people throug matter national policy formulation or enterprise operation and management, even decisions cannot leave without decision-makings. Due to the importance of deci stakeholders, how to make an effective decision is always a focus of attentio decision support system makes use of the computer, software and other technol provide people with ancillary support functions in the decision-making process an effective decision. The decision support system, which focuses on solving s structural problems and emphasizes the friendliness of man-machine interactio important role in enterprise management, macroeconomic planning and disaster p long time.

Western countries' study on modern decision theory started early and emerged an scientific management theory after the industrial revolution, especially since 1 decisions have become an important research field of western public administra the economic development of western developed countries and the deepening of reforms, the study on administrative decisions have received more and more atte number of theoretical achievements have emerged. The typical theoretical achi mainly: Simon's decision making theory in 1940s; Lindblom's theory of Incrementalism and decision-making in the 1950s; Drucker's effective decision-making theory

Anderson's public decision-making theory in the 1970s; Heidenheimer and Helco' public decision-making theory in the 1980s; and Hammer and Champy's team deci theory in the 1990s.

Along with the rapid development of information technology, especially the ma application of the Internet, e-government affairs have been quickly establis become mature in the United States, United Kingdom and other western develop Foreign experts and scholars started to turn their attention to researching g making models. In the Reinventing Local Governments and the E-Government Init United States, the traditional bureaucracy model was compared with the electr model, and the Internet was considered not only to provide a powerful instrumen local governments but also promote the transformation of the government manageme the traditional bureaucracy model which emphasizes standardization, department effectiveness to the e-government model which highlights harmonizing network external cooperation and customer services. With the advent of global informati marketization and economic times, the original bureaucracy model was impac theoretical fields placed their research emphasis on how to make use of e-gove technology, to redesign the organizational decision making process so as democratization and scientization of administrative decisions.

2. Theoretical System of Intelligent Decision Support Systems

2.1 Intelligent Decision Support System

An intelligent decision support system is an auxiliary decision system that intelligence (AI) and DSS together and applies the expert system technology t better make full use of human knowledge, such as descriptive knowledge on deci procedural knowledge during decision making and inferential knowledge for solvi help solve complex decision problems through logic inferences.

The concept of IDSS was first proposed by Bonczek and other American scholars i functions are to handle both quantitative and qualitative problems. Its core id with other relevant scientific achievements to make DSS have artificial intellig Please make sure that every reference cited in the text is also present in the versa).

2.2 Structure of the Intelligent Decision Support System

A relatively perfect and typical DSS structure is a four-base system structure through providing a traditional three-base DSS with a knowledge base and an i adding a natural language processing system to the man-machine dialog subsystem, problem solving system between the four bases, as seen in the figure below:

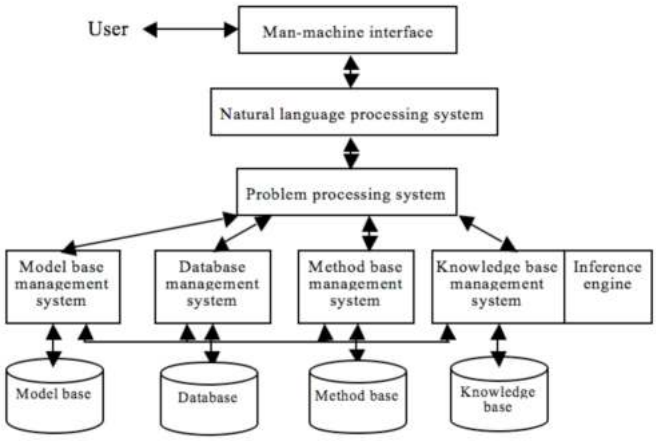

Figure 1. Structure Chart of Intelligent Decision Support System

2.3 Features of the Intelligent Decision Support System

1) Based on the mature technology, easy to construct practical systems.
2) Make full advantage of information resources at all levels.
3) Based on regular means of expression, easy for users to grasp and use.
4) Possess strong modularity characteristics, along with good reusability c development cost.
5) The system has a flexible combination of different parts, can realize a str to maintain.
6) The system can quickly adopt advanced supporting technologies, such as AI te

2.4 Operational Efficiency of the Intelligent Decision Support System

Because during the operating of IDSS, each module needs to repeatedly call the compared with the mode of directly adopting the lower-level call, its operatio However, considering that IDSS only runs when senior managers make a major operational efficiency is much lower compared with other information systems. operating environmental conditions for each run vary considerably, thus it is partial operational efficiency to get the efficiency of system maintenance in re

3. Key Problems Resolved by Intelligent Mayor Desk

As the world has entered into a critical stage of 50% urbanization rate, there challenges in terms of urban economic and social environment. Urban planning an operations management must be based on rational allocation of resources. The ke of new urbanization in China lies in changing the original extensive develo intelligent operations management and constructing a smart city. Under the sup science and technology, the positioning, planning, construction and management digitization, networking and intelligentization and critical problems like n ecological urban development.

Due to the complexity and chronicity of the large-scale construction of a smart city mayor plan the organization and implementation as a whole, which determine the mayor decision-making and command system in the smart city. However, there a barriers and challenges for the building of a command system in charge of the ci

1) Diverse sources of data. During the construction and operation of the city, departments may obtain completely different formats of data, including survey d texts, statistical figures, audio and video, real-time sensor data, etc. How to source codes of different system data formats through an integrated platform problem.

2) Unstructured data formats. Urban data volume is a massive data volume. T constructing a smart city is to complete the integration of traditional str unstructured data as well as the adding and updating of traditional yearbook d data so as to form a unified database. To transform from the traditional annuali real-time updating data processing stage is a technical difficulty for large ur academic circles try hard to tackle.

3) Secure and precise data. Large urban data involve different systems and levels of th what kind of data correspond to which urban management layer, and achieve reduc acceleration of the city mayor decision-making system while ensuring the safe decision-making system. During the application of multi-channel massive real-t safeguard the safe operation of the mayor decision-making system is a marking country s urban decision-making system.

Currently, there are giant gaps in real-time obtainment of urban data, int immediate feedback. It is a worldwide problem how to realize urban decision-mak a scientific and rational way. The smart city mayor decision-making system solv non-interoperability of urban management and delayed feedback of management inf integrating urban monitoring and management information data. Supported by logis platform and other ICT technologies, this system, specific to new demands a intelligent development of Chinese cities, realizes the analysis and expressi satisfy the urban decision makers at all levels and the real-time transmission and offers an integrated support platform for decision behaviors, in the cont decision-making system and urbanization development.

The mayor decision-making system builds a multisource, multi-scale and multi- database integrating social, cultural and economic fields based on space data database breaks through the traditional data acquisition methods and improves t acquisition to seconds. Meanwhile, it also uses for reference the data judgment for traditional data and applies them to the large data platform.

The mayor decision-making system sets up metadata exchange standards, breal traditional data processing mode, makes use of structured data to establish ex achieves precise description, rapid positioning, accurate search and value eval data.

The mayor decision-making system establishes multi-level data screening systems decision-making models. It integrates various data through all kinds of systems and pre-warns the identification and early warning of urban sustainable develop the dynamic 3D demonstration and accomplishes the automation of the whole urban decision-making process.

The above three points constitute the core technology system of the mayor deci The system, for the first time, realizes the unified data acquisition and exc overall urban level, integrates upward the information from different fields and p the method and technology support for the establishment of demonstration comprehensively, promptly and effectively copes with various demands of mayo improves the speed, level and quality of mayor decisions through using differe

resources and analytical tools, and makes urban administrator demands transform empiricism management model to the rationalism management model.

4. Framework of the Intelligent Decision-making Platform

Figure 2. Structure Chart of Intelligent Decision-making Platform

Intelligent decision-making platform has 4 major functions:

1) Intensive sense: to make decisions under the support of sufficient data;

2) Accurate judgment: to pre-judge the status and result;

3) Appropriate reaction: to mobilize resources for coping according to scenari minimum consumption of energies, resources, time and social mentality;

4) Continuous learning: to constantly improve the decision model and proces continuous progress.

Table 1. Smart city-leadership decision-making platform

Serial No.	Function Module	Function Submodule
1	Development performance	Economic Subsystem
		Social Subsystem
		Ecological System
2	Resource pooling	Space resource pooling
		Human resource pooling
		Financial resource pooling
3	Bottom-up report	Document issuance
		Communication with the Municipal Bureau
8	Major projects	World Expo project
		Economically affordable housing
		Disney project
6	Emergency responces	Natural disasters
		Social security
		Accident disaster
		Public hygiene
4	Daily management	Schedule management

		Documents reading and commenting in Teleconference
5	Experience Study	Urban development case base Urban encyclopedic knowledge base Urban data knowledge base
7	Comments Summary	Citizen information feedback Government agency feedback Enterprise alliance feedback

4.1 Development Performance Module

The execution of government programs includes various types of economic indexe protection indexes, security housing indexes and emission reduction inde performance assessment indicators are different in different provinces and citi divided into economic development, social development, environmental develop harmonization. Therefore, it is required to choose different indicators on the d of urban decision makers specific to different cities, and consult the gov evaluation weight for the comprehensive evaluation method. The module reflects part and happy livelihood part cared by urban decision makers and is the qua decomposition of the overall strategy and livelihood status.

Table 2. Framework of Development Performance

Development Performance									
Economic System			Social System				Environmental System		
Economic Development Level	Comprehensive Economic Development Benefits	Income of Urban and Rural Residen	Basic Educatio	Urban Employment	Medica Health	Urban and Rural Cultura Life	Energy Conservati and Emissi Reduction	Resources Conservati	Science a Technology Input and Innovation

4.2 Resource pooling module

Make an inventory of available resources within the city, including human resou and financial resources. Be clear available human, financial and material resou as to transform external resources and effectively use internal resources. Th overall and fractionized conditions of various resources available to urban d object of decision making.

Table 3. Framework of Resource Pooling

Resource Pooling							
Human Resource		Space Resource				Financial Resour	
Organizat Structure	Task Assignment Status	Land Use Status	Land Planning Conditions	Land Gran Conditions	Investmen Promotion Progress	Riscal Revenuel Monitoring	Fiscal Expenditure Monitoring

4.3 Bottom-up report module

An urban decision maker needs to keep up with the instructions and spirit of sup read all kinds of documents to be issued, thus making a separate module to sort the docum convenient to convey information in real time and inquire records at any time. T superior management and decision-making information of the city and is the guidi management and decision-making.

Table 4. Framework of Bottom-up Report

Bottom-up Report						
Document Issuance				Communication with Departmen Bureaus		
Decision Mak	Annoucement	Notice	Circula	Report	Request	Officially Re

4.4 Major project module

An urban decision maker needs to make some major projects with highlights during office. The module includes major project objectives, implementation schedule, t accomplishment degree that an urban decision maker cares about, and can also upd in real time and control the project progress at any time. The module reflects t projects that the urban decision maker is concerned about and is the key to real goal.

Table 5. Framework of Major Projects

Bottom-up Report						
Project I					Project II	Project III
Goals	Implementation Schedule	Time Nodes	Completion Level	Onsite Pictures	Same as Project I	Same as Project I

4.5 Emergency Responces module

The urban decision maker needs to make the fastest response to emergencies, and most appropriate way so as to minimize the losses of life and property of citize installed with an alarm system which directly connects to the weather bureau, pu the environmental protection agency, road transport bureau and other important d reports emergencies to the leadership at the first opportunity, and directly loc enable the whole leading group to start a contingency plan or directly hurry to issue. The modules reflects emergencies during the urban decision making process controllable methods to cope with relatively uncontrollable issues and serves as normal operation of urban management and decision making.

Table 6. Framework of Emergency Responces

Emergency Responces							
Natural Disasters					Accider Disaste	Publi Hygiene	Social Security
Fire	Typhoon	Flood	Pollutant Leakage				

4.6 Daily management module

The module refers to the urban decision maker s daily work schedule and affairs including three parts: 1. Schedule arrangement: use Cloud calculation software t which can carry out real-time updating and facilitate to control his/her own iti upload daily important documents or conference introduction to be handled in adv Teleconferences: connected with video equipment which enables the urban decision maker

conference agenda that he cares about at the office and avoid the traffic time c
conference place and back. The module reflects the daily management work content
decision maker and pools all kinds of information to the informatization office

Table 7. Framework of Daily Management

Daily Management		
Schedule Arrangement	File Preview	Teleconferences

4.7 Experience study module

The urban decision maker needs to follow closely the development footstep, learn
measures and practice projects by surrounding regions and benchmark cities and bring ex
enlightenment to the development of the city. It is required to set up a profess
case content of various sub-modules every day and conduct real-time update so as
decision maker see the latest events and excellent cases. The module reflects th
development of issues that the urban decision maker cares for are best practice
maker continuously learns.

Table 8. Framework of Experience Study

Experience Study											
Economic Development Experience			Social Development Experience			Environmental Protection Experience			Urban Management Experience		
Domesti Surround ng Cities	Domes tic Key Cities	Foreig Advanc ed Cities	Domesti Surround ng Cities	Domest ic Key Cities	Foreig Advanc ed Cities	Domesti Surround ng Cities	Domest ic Key Cities	Foreig Advanc ed Cities	Domesti Surround ng Cities	Domest ic Key Cities	Foreig Advanc ed Cities

4.8 Comments summary module

The urban decision maker needs to keep real-time watch on the city s conditions
set of bottom-up information feedback mechanisms is required, including opinions
citizens, experts, NPC and the CPPCC and enterprise institutions, all of which s
adopted after the comprehensive study. The module reflects the pathways that mul
participate in urban management decision making and is a fast channel for the ur
hear the advices and suggestions of different parties.

Table 9. Framework of Comments Summary

Comments Summary								
Citizen Inform Feedback		Enterprise Institution Feed		Organization Feedback			Intelligence Consultation Feedback	
Microbl Feedback	Urban Decisio Maker	Enterpr Alliance	Industry Associati	NPC	CPPCC	Party Committee	Indust	Agricult

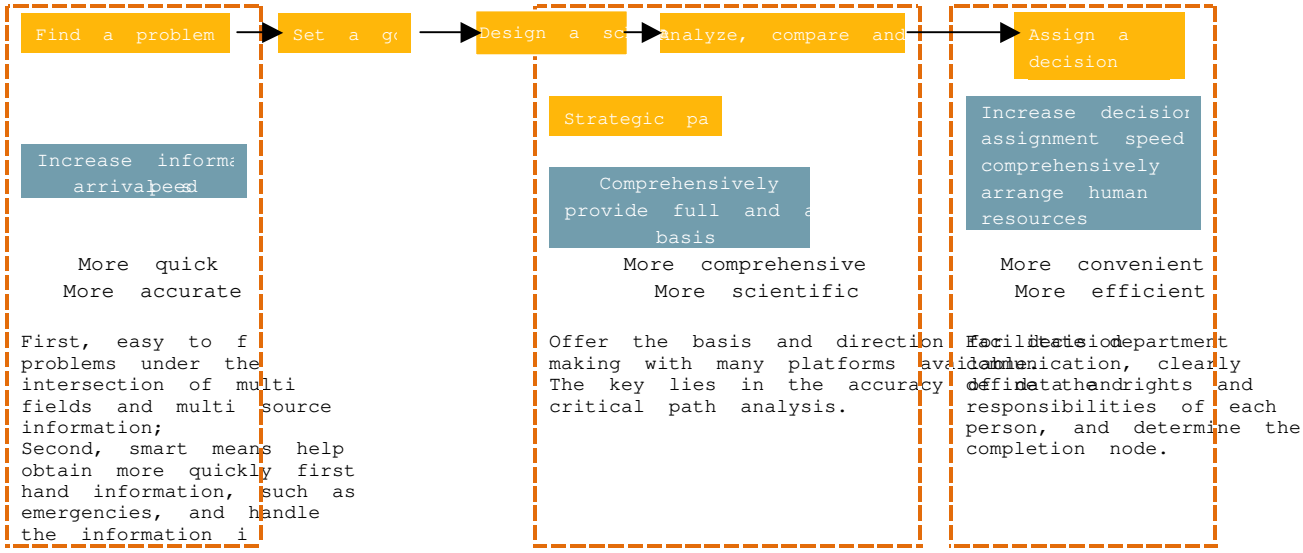

Figure 3. Decision-making Process

5. Development and Promotion of Intelligent Mayor Desk

Since its launch in November 2011, the Intelligent Mayor Desk project has ma network, cloud platform and other ICT technologies to exert itself to get throug barriers, realize the spring up and activation of information and enable the ma and wisely control the real time conditions of the city, thus making analysis decision response. Besides, with the help of the Intelligent Mayor Desk , the predict the future of the city and comprehensively master periodic problems duri

When a fire occurs unexpectedly in the city, the system can automatically give an alar mayor and his leading group able to start a contingency plan at the first op connects to the weather bureau, public security bureau, the environmental pro transport bureau and other important departments, directly locates the pla intelligently schedule the most appropriate disaster-relief resources and real condition of resources and the tracking and supervision of the responsible p integrates and analyzes the large data of different social media, pays close experiences of on-site citizens through the publishing of social media, and put direct train of opinion feedbacks between the mayor and citizens and restoring Besides, the system can intelligently search nearby major dangerous sources, disaste and other information, check erroneous ideas at the outset and predict and elimi

The smart city essentially features the spring up and activation of informat decisions, and serves the beautiful environment and life of the city as well a The Intelligent Mayor Desk adheres to giving play to the top-level design value makes use of information technology to achieve optimal social, economic an harmonization and minimum consumption of the city to meet the happy life of operation of the city and ecological vigor of the environment.

Figure 4. Intelligent Mayor Desk

Figure 5. Interface of Intelligent Mayor Desk

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