

An empirical study on application and efficiency of gridded management in public service supply of Chinese Government

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Abstract

Purpose – Gridded management in the public service supply is still in the experience exploratory stage, and this paper aims to analyze the inherent logic and operation mode of the gridding mechanism of the public supply based on the existing theory study and practices, and verify its efficiency so as to come to the conclusion whether it could be promoted to a wider range.

Design/methodology/approach – The methodology applied in this paper was case study/deductive induction.

Findings – The grid model in the public service supply needs to be demonstrated completely in theoretical logic and operation principles before it is promoted across the country. Meanwhile, full support of the government is required in terms of service concept, function distribution, technical parameters and infrastructure.

Research limitations/implications – The inherent logic and operation mode of the gridding mechanism of the public service supply needs enough practice tests. The practical test of efficiency analysis of the gridding mechanism of the public service supply is not enough.



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Social implications – This paper validated whether the gridding mechanism that originated from China’s urban management can be promoted to all over the country in the public service supply. It provides references for government policy.

Originality/value – This paper constructs a gridded management model for public service provision in urban and rural areas on the basis of an analysis of the plight of traditional model of public service provision, thus delivering the same standard of public service for both urban and rural areas through optimization of resource allocation without requiring more supply and fundamental change to the content of service.

Keywords Chinese Government, Gridded management, Public service supply

Paper type Research paper

1. Background

Gridded management changes the fragmented public resources distribution in urban management of China, and caters a new way for the public service supply. By combining the decentralized and personalized service demands with the sporadic supply mode, this management approach can satisfy the supply and demand of public services to the greatest extent. It has been successfully experimented in over 50 cities, including Beijing, Shanghai and Wuhan, yet it still requires a more in-depth theoretical study for a better theoretical support to affirm if this novel mechanism of the public service supply that originated from China could be promoted nationwide or even worldwide, and how its efficiency could be.

2. Overview of study

A dilemma has appeared in the whole world that the supply of services has increased but the demand of public still cannot be satisfied. It has become a worldwide concern to optimize the public service supply and a crucial matter for the governments to innovate the system to promote the effective supply of public services. Gridded management is introduced into the public service supply in this context.

2.1 Information technology – electronic application in public service supply

In Western countries, the study on grids is predominantly focused in the field of research and development of computer technology, rather than a management method, and up till now, there is no research directly related to the public service supply. Warren (1987) refers to the networking system concept in the supply of public services and reckons that the community public service supply system is a “system of systems” jointly composed by a “horizontal structure” and a “vertical structure”, among which the former is the link of structure and function coordinated by each unit and subsystem within the community, and the latter is the link of structure and function interacted by the community and the external system. Most Western scholars emphasize on the database, standardized information and resources sharing, while Fountain (2014) points out the biggest challenge of the public service supply is to eliminate the conflict among the functional sectors of the administrative organization. In fact, it has been made clear that the information technology will be reasonably combined with administrative management.

With the launching of hundreds of grid research projects, grid application in the USA has improved from the integration of computing resources and information resources from different geographical locations, such as Globus (Legion Project), to the capabilities of information optimization (Condor project), information prediction and scheme pre-order (AppLeS project), and even to the capabilities of satisfying the comprehensive demand of the National Science Foundation, the Environmental Protection Agency, the Nuclear Regulatory Commission, the Department of Energy, the Department of Defense and the National Institutes of Health (DOCT project). The nomadic project sponsored by the Office of the

Deputy Prime Minister of UK implants the mobile information technology to the full supply of public services and builds a comprehensive platform that combines local governments at all levels and all sectors by means of mobile technology to improve the effect of the public service supply, and this has been demonstrated with fairly good achievements in the public interaction with city councilors, unified assessment, street view, iText messaging service, building control and mobile cemetery.

2.2 Urban gridded management

The attention on gridded management by the Chinese scholars starts in the practice of urban management. The official operation of the information platform of urban grid management of Dongcheng District, Beijing, in October 2004 pioneered the application of grid technology in urban public services. It was rapidly well received by the public management for being instant, seamless and refined. Over 50 cities in China experimented with gridded management in the public service supply as of September 2014. The theoretical research related to gridded management has won a number of national research project grants, including 1,151 projects funded by the National Natural Science Foundation, totaling RMB543,670,000; 44 projects funded by the Social Science Fund; and a number of research projects supported at the provincial and ministerial level. According to the statistics obtained from the China National Knowledge Infrastructure (CNKI) database, as of September 12, 2014, there have been 55 achievements in science and technology in grid research and 27 achievements supported at the provincial and ministerial level; there are as many as 50,312 articles with the keyword grid in CNKI, and 395 journal articles with the keywords gridded management and public service.

As the practice is conducted before the theory is studied for gridded management in China, a summary and sorting of experience from the practice accounts for 71.78 per cent of the existing documents. Wang *et al.* (2006) argued that it has to be improved for gridded management in the process specification, command mechanism and evaluation mechanism. Song (2005) measured the efficiency and value of gridded management in the public service supply based on the completed urban gridded management and service system of Jiangnan District. Chi *et al.* (2008) suggested that the types and characteristics of the problems that can be solved by gridded management have to be discussed in a profound manner, and the fundamental goal and the requisite condition of gridded management should be considered. Wuhan. Han (2011) summarized the application of gridded management in public services of “one grid, three members” in the community and street management of Nanshan District, Shenzhen, and promotes actual operation of gridded management in public services by the linkage of four mechanisms, including coordination, discovery, warning and diversion. Wei (2013) declared that grid management should not only be the pure application of new technology but also the urban community governance creation activated by the application of new technology and realized by the rebuilding of the operation flow. Yang *et al.* (2015) pointed out that developing the platform of the urban grid management service, integrating the resources of various kinds of management services and innovating the refinement of urban management and service are the goals of the smart city construction with Chinese characteristics and also the effective breakthroughs.

2.3 Grid principle

Studies on the grid principle in the existing documents only account for 28.22 per cent, mainly clarifying the source of the gridded management ideology, basic concept and application prospect. Zheng *et al.* (2005) defined the grid as a new technology built on the internet that integrates the entire internet into a supercomputer, so as to achieve full sharing of computing, storage, communication, software and information. Chi *et al.* (2008) deemed that the ideology of

gridded management comes from the supply of water and electricity, and gridded management contains the grid and the user, which realizes a two-way interaction through technology agreement and management agreement. The users can enjoy the service anytime once they submit the demand, and the grid is responsible for providing services quickly and accurately. [Zhu \(2012\)](#) said that gridded management was a major reform and breakthrough in the government management process following the “Seamless Government Model”. It implants factors such as service, information technology and comprehensive management into grassroots social management work, and effectively increases refinement and comprehensive social management. [Zhu and Bai \(2010\)](#) proposed that the grid should be upgraded as an ideology for management and resource allocation, and the coordination system should be redesigned by the grid theory; with the concentration effect, inefficiencies of the traditional allocation of public service resources can be effectively solved, and the feasibility of gridded management application in crisis warnings and equalization of public services in urban and rural areas is also explored. [Jiang and Ren \(2013\)](#) declared that the urban grid management mode is a set of urban management ideas, tools, organizations and flows that forms the base of digital technologies and takes grid management as its basic character. [Li and Wei \(2014\)](#) pointed out that grid management is a kind of urban management revolution and innovation. While [Chen and Xiao \(2015\)](#) expressed that in the recent development of community governance, the trend of “no grid, no management” has appeared in urban grid management.

In summary, there exist divergences concerning the features of the grid management mode. There are two typical viewpoints. One is called the view on controlling order. According to this viewpoint, the grid management mode from its institutional arrangement represents a series of city management activities in the three functions of society control, information transfer and community services, integrally taking advantage of hi-tech means but still aiming at society control. The other is called the view on diversified services. According to this viewpoint, the grid management mode has realized the transformation from the controlling to the services, i.e. the transformation from favoring the rigid administrative means to emphasizing the comprehensive management with economical, moral and technical measures.

Gridded management upgraded from a practical level has become the concept and ideology rising from an abstract technology. A consensus has been reached in both the academic circle and the management circle that it can be applied to optimize the public service supply, which builds a framework of basic research on gridded management in the field of public service. However, the study is still weak regarding how to optimize the supply of public resources by the gridding mechanism and how to enhance the efficiency of supply by the new model. In particular, there is no scholar conducting systematic research on what exact logical framework this new management service model is built on and how it is operated, which is the focus of this paper.

3. Inherent logic and operation mode of gridding mechanism of public service supply

3.1 Inherent logic of gridding mechanism of public service

The gridding mechanism of the public service supply breaks the concept of departments operating separately, connects each management level and balances the management power by means of unified distribution and collaborative sharing of public service resources. The goal of improving efficiency is achieved by adjusting the public service model and revitalizing the existing resources within the system, yet without expanding the investment. The gridded management mechanism has evolved from the original two-dimensional plane to a three-dimensional grid to match the supply and demand of public services. The inherent

logic of the public service gridding mechanism is to connect the line by points, establish vertical links; to connect planes by responsibility, establish horizontal links; and to cross the vertical and horizontal links to set up the dimensional grid.

3.1.1 Connects the line by points and establishes vertical links. First, it connects the line by points and establishes vertical links. The grid public service mechanism connects the dynamic service demand with the static sector supply for quick-response. This response is first a vertical response, which is replied to a demand by the public service supply sector and forms a linear connection between the demand and the public service supply sector; while the supply sector first responds to the demand, there is no initiative and effective connection with other supply sectors. For example, in case a traffic accident occurs as two vehicles collide on a major road, this information will be instantly passed simultaneously to the police department, the first aid department, the firefighting unit, the insurance company, the community and the workplaces of the parties involved, forming the vertical link between the public sectors and objects of demand. The public sectors change from being asked to supply services to serve initiatively, and the public can wait for the service to come instead of struggling for finding the service.

3.1.2 Connects planes by responsibility and establishes horizontal links. Second, it connects planes by responsibility and establishes horizontal links. There is no need for the public to appeal to each functional sector once the grid instantly communicates the public demand to various authorities, which will automatically complete relevant processes through initiative contact among the sectors. For example, once the two vehicles that collided on the road with major traffic are evacuated from the scene of the accident, the people involved may need to be hospitalized. The public authorities change from providing service to asking for service, and the public enjoys the service instead of requesting service.

3.1.3 Crosses the vertical and horizontal links to set up the dimensional grid. Finally, it crosses the vertical and horizontal links to set up the dimensional grid. The supply of public services by the gridding mechanism is a dynamic, continuous and relative process. It provides comprehensive, seamless and satisfactory services to the public through a dimensional grid under the policy schedule. The public services with a vertical link respond timely, but the service it provides is a single one; public services with a horizontal link save time and effort, but it is an idealized service with the real demand ignored; crossing the vertical and horizontal link can guarantee the services provided to be comprehensive. Thus, the three-dimensional grid of the public service mode was formed by covering the public services with a three-dimensional network and providing services by gridded management. Among them, the policy schedule is the essential joint for gridded management to go from assumption to reality and also the guarantee for operation of the three-dimensional grid. For example, when the accident occurs, the parties involved will first establish a vertical link with the traffic police, the first aid department, the firefighting unit and the community; they will be promptly evacuated from the scene and sent to a hospital, with family members being informed; the subsequent information, including verification of liabilities, accident compensation, hospitalization, leave from work and daily life care, is automatically transferred through a horizontal link among the authorities, which certainly will be conducted with the consent of the parties involved, and it ultimately forms the grid public service supply model with information as the link, duties as the driving force and service as the goal.

3.2 Operation mode of gridding mechanism of public service supply

A discussion of the operation of public service supply mechanisms should be carried out at two levels: administration and technological operation.

3.2.1 System construction. The first step is the designation and construction of the system. First, a Working Group is established by the government with the concept that public service authorities should be altered from being superior to being initiative to ask the demands and serve. Responsibilities of each level and service functions of the authorities will be clearly stated in the system so that each staff from the service sectors is clear of the specific work of gridded management of public services and functionality of the grid system. Second, the existing service resources and technology networks of the public sectors are integrated. It consists of two aspects, one is to reconstruct administration processes and responsibilities and set up supervision so as to achieve grid normalization of daily grassroots affairs, and the other is from the technology aspect, to develop grid spatial dimensions and data-sharing standards and construct a unified data platform and portal for public services, as shown in Figure 1. For example, the Urban Management Command Center has been established in Dongcheng District, Beijing. In all, 350 urban grid controllers are responsible for full-time monitoring of 1,593 grid units, and they provide timely reports of the demand for public services to the Command Center. The resources will be allocated by the Command Center with the supervision of the Control Center to achieve the refinement and dynamic management of public services (Figure 1).

3.2.2 Operation process and collaboration work. The second step is the operation process and collaboration work. Clear process and collaboration is the core of the gridding mechanism. In the process, different departments perform their duties under the coordination of the Command Center. The main functions of the City Department are to dispatch the supply and demand and report the overall situation of public services in the region; the Township Department is responsible for the transmission of information and the division of tasks; and the grassroots Grid Department is responsible for collecting specific signals of demands for public services and providing the services.

In the technological operation, the supply and demand resources of public services are broken down by multi-agreement negotiations, and contents transferred among resource nodes are introduced in entirety, ensuring that the requirements of the agreement are accurately expressed and supplied. Supply and demand meta-data of all users is collected by the grid platform, and the meta-data, after being classified and

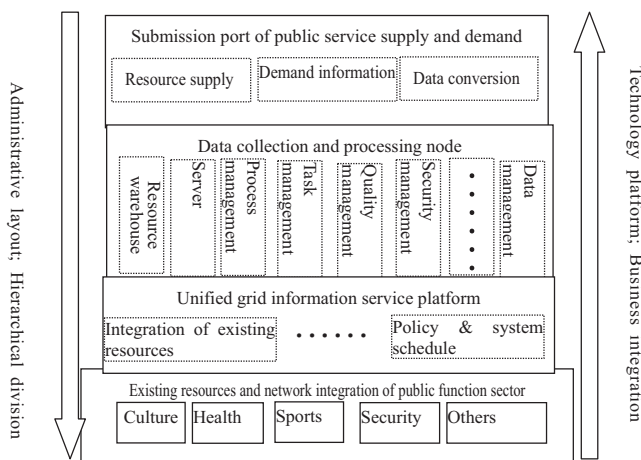


Figure 1. Grid system of the public service supply

sorted, is distributed to different meta-data storages to be matched. Automatic matching is achieved by the data system in the grid middle layer, which minimizes staffing and improves requirements of both the supply and demand of public services. For example, the grid public service system of Zhoushan City consists of three levels: first, to set up five-class grid systems from the city to the grassroots level; second, to require the integration of public service resources by various management levels, with vertical and horizontal work combined; and third, to establish an integrated management and service system to coordinate the conflict and assess performance. In the technical process, the complex and cross-sector public services are integrated in the virtual system by means of geo-coding technology and mobile information technology, the procedures and the operation process of a closed business are optimized and re-engineering of the public service supply process is promoted.

3.2.3 Guarantee of operation and monitoring of efficiency. The last part is the guarantee of operation and monitoring of efficiency. The government provides policy support by formulating normative documents and material support by reserving adequate funding and infrastructure, and allocates public officials to monitor possible public services. The information database is established, and the components of the objects of public services are integrated by the use of the geographic information system and spatial information system. The Command Center is instantly alerted once the public has doubts on public services. For example, the regulations on sub-district committees of Changning District, Shanghai, have been revised during the gridding process of public services, where the relationship between vertical and horizontal organizations and related functions are stipulated; at the same time, 1,459 grids are monitored by 111 controllers by means of the grid information platform to ensure timely finding and immediate fixing of public issues. Monitoring of efficiency is the end of the gridding mechanism of the public service supply. The exclusive quality assurance system has been established by the Command Center to carry out whole-process monitoring of the efficiency of the public service grid supply and receive timely feedback of the public users on public service supply, so as to make adjustments (Figure 2).

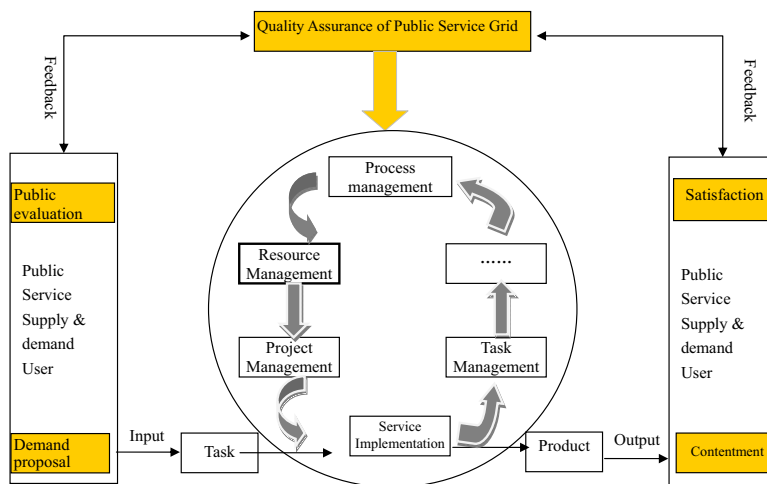


Figure 2.
Efficiency monitor of the gridding mechanism in public services

4. Efficiency analysis of gridding mechanism of public service supply

The grid mechanism of the public service supply in China is fairly mature. As of 2011, 33 pilot cities out of 51 were found acceptable, and the development process is as shown in Figure 3.

The efficiency of the grid mechanism of the public service supply can be investigated in two aspects: one is the convenience of the government supply of public services and the benefits of the supply, and the other is public contentment and satisfaction on public services.

The gridding mechanism of the public service supply realizes the change of the public service supply from ruling to serving, with a clear process for the public service supply, simple procedures and efficient implementation. For example, the 10,000 m unit grid is applied in Dongcheng District, Beijing, for integrated urban component management. With the use of a dual system of management and supervision, the accuracy rate of task implementation reaches 98 per cent, the disposal rate reaches 90.09 per cent and the clearance rate reaches 89.78 per cent. In the five years after the grid management is established in Dongcheng District, about 44 million Yuan of the city management fund may be saved each year, while the establishing fund reaches less than 10 million Yuan for implementing the new mode in the district. Altogether 220,000 cases of urban management have been registered and handled in Changning District, Shanghai, from October 2004 to October 2011, with the average closing time to handle a problem of only 6.5 hours, six times more than the number of problems handled in the past; 19,617 cases of inharmonious factors have been reported by the grid in Taoyuan District, Shenzhen, out of which 19,497 have been resolved, at a rate of 98.92 per cent; 14,149 have been resolved by the community grid, accounting for 71.42 per cent, five times more than the number of problems treated by the original model. Compared with the traditional supply model of public services, the problem detection rate of the grid public service supply model is improved by 60 per cent, the average closing time is deducted by 22.4 times and the number of problems disposed per month is increased by 5.3 times.

In Wuhan City, 13,210 cases have been registered with a settlement rate of over 80 per cent and an average daily handling number of over 100 cases, as the grid management system is put into use only half yearly. In Jinyuan Community, Huizhou City, Guangdong Province, since December 2014, 26,915 pieces of messages have been acquired and recorded, 113 cases

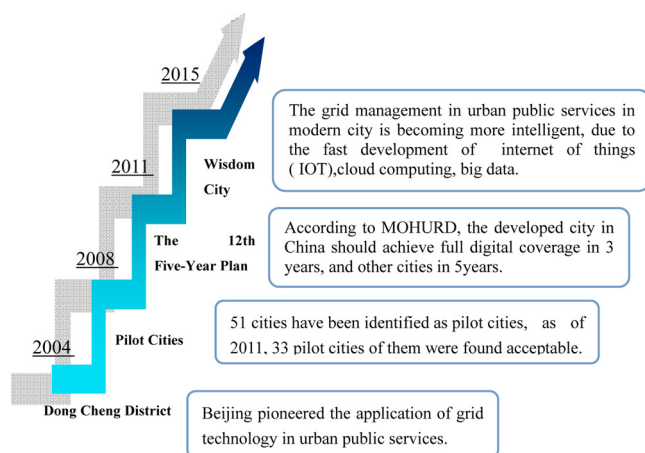


Figure 3.
The gradual development process of grid management in urban public services in China

have been accepted and 106 cases of public appeals have been settled, with a settlement rate of 94 per cent. In Changzhi City, Shanxi Province, the number and quality of event acceptance and handling have greatly increased after the system was operated in the second half year of 2013. Up to July 2015, the three levels of the municipal centers had accepted 195,687 cases and effectively handled 165,351 cases reported by the grid managing personnel. In these cases, 48,502 were accepted and classified as the safe construction events with 13,252 effectively handled, 14,728 as public appeals with 4,086 effectively handled, 31,546 as public service events with 16,859 effectively handled, 2,600 as emergency response events with 1,259 effectively handled and 79,576 as the miscellaneous with 16,440 effectively handled. In Chaoyang City, Liaoning Province, in the three years after the grid management mode was operated, the 362 grids in all sub-district offices of the city have collected 39,000 pieces of various kinds of basic data messages, the platforms have recorded and handled over 790 cases of various service management events and the grid managing personnel have kept over 1,800 diary entries concerning popular opinions. Various service teams have handled over 1,200 cases of various events for the residents, solved 1,900 cases of problems of various kinds, discovered and eliminated over 1,100 cases of various potential hazards and conflicts and eased over 800 cases of disputes.

The gridding mechanism of the public service supply realizes in a certain extent to obtain public services as per demand; exempts the public from having to run from pillar to post, among the government sectors; and enables the public to enjoy the services, rather than request the services. According to the economic assessment report issued by the Unirule Institute of Economics, Beijing, gridded management of public services brings additional benefits of at least approximately RMB158 million Yuan per year for the residents in Dongcheng District, saves the costs of more than RMB54 million Yuan and provides 411 employment opportunities. Based on these data, as there are 660 cities of all scales in China with the existing urban area of 28,308 km², assuming that the grid supply of public services is promoted across the country, a total cost of RMB146.4 billion could be saved per year, bringing an increment of social welfare of approximately RMB57.5 billion and 460,000 new job opportunities.

In Luwan District, Shanghai City, the number of public complaints has dramatically dropped after grid management was implemented. The repeated complaint rate was zero in November 2005, and the complaints from urban construction hotlines also dropped by about 50 per cent. The number of appealing cases lessened 370,000 in Zhejiang Province in 2009, compared to that in 2008, and especially, it has dramatically dropped for complaints regarding the working style of party members and the work efficiency of various offices. So far, the grid management teams in various levels of the province have found out more than 1.81 million events after investigations, eased more than 1.38 million cases of various conflicts and disputes, solved 464,000 problems for the public and benefited over 11.9 million persons in total. In Xixiangtang District, Nanning City, Guangxi Province, after the grid management mode was implemented in 2014, over 110,000 suits of housing and about 250,000 migrants have been acquired and recorded, 1,795 cases of conflicts and disputes have been eased, 7,271 person-hours of job training have been provided, 190,000 copies of various kinds of publicity materials have been distributed and 30,766 person-hours of free health check-up for the fertile women of the immigrating population have been conducted. The public safety and satisfaction rose dramatically up to 87.92 points in 2015 from 69.5 points in 2013.

In practice, the operation of the current grid system of the public service supply is mostly explored step by step, hence still leaving many problems to be solved. For example, traditional management is still the mainstream; the conflict between the new and old systems

New management mode	Less management cost	Higher management efficiency	Better management benefit
Services mode transformation	Less human cost Less civil servants' work	Higher daily management efficiency Intensified order control	Promotion in satisfaction of demands Better management benefit
Transformation from extensive management to delicate management	Less civil servants' work	Higher daily management efficiency	Higher public satisfaction degree
Transformation from static management to dynamic management	Specific work division of functional departments	Immediate service supply	Better availability of governmental services
Transformation from passive management to active service	Identified work task of the management	Accurate affair management	Consolidation in public subjectivity
Transformation from post-incident handling to early warning	High self-governance degree of residents	Less inter-department coordination	Higher public engagement
Organizational structure transformation	Automation in information collection and handling, less office appliances, less material requirements	More timely crisis early warning and higher degree of early warning	Change in civil servants' working style
Work flow innovation	Flat management to side linearization Standardization Delicacy Informatization	Emergency handling	Better service quality Satisfaction of demands Better inhabitation environment Honest political atmosphere
Operation mechanism perfection	Intensive management for less time of public services	Less social costs	Interaction between governmental management and residents Encouraging public engagement in services

Table I.
Positive effect of grid management of the public service supply on government management

cannot be eliminated; the interest disputes among the sectors increase; the Command Center faces more stress; the staff varies in ability and quality levels; the system hardware does not match the grid requirements; and the technical defects, digital divide and map updates also objectively restrict accurate positioning of public services as well as the operation of the information stream. These operational problems will be solved with the development of technology, but the more in-depth problem is that most of the fields that practice the gridding mechanism of the public service supply see it only at the Technical level, rather than upgrading to the management level.

5. Conclusions

The following conclusions are summarized according to the above research:

- The grid management of the public service supply is rather aimed at innovation of the grassroots social management mode than limited to as a remedy of the traditional public services management mode. Based on such advantages as effectively overcoming various malpractices of the traditional public service managements, saving the administrative management costs, improving the management efficiency and promoting the management benefits, the grid management mode will provide a practical route for advancing the grassroots government function transformation and facilitating the social development (Table I).
- As a management mode in its immature stage, the grid management of public services still has lots of problems to be solved, which lie in that, first, the theoretical study for application in the public service supply is rather premature. The theoretical logic and operation principles have not yet been demonstrated completely in theory. The grid operation of the public service supply mainly relies on the experience with insufficient theoretical support. Second, instead of being a mere technical means, gridded management should be upgraded to a management thinking to build the grid service model with information as the link, duty as the driving force and service as the goal, so as to provide a solution for the efficiency of supply and demand of public services. Third, introduction of gridded management in the public service supply requires a reform in orientation. Gridding of the public service supply is public demand-oriented, initiated by the public from the lower level to the upper level, which is a re-engineering of the operation process and even a reform in the public service model. Fourth, the grid model in the public service supply needs to be demonstrated completely in theoretical logic and operation principles before it is promoted across the country. Meanwhile, full support of the government is required in terms of service concept, function distribution, technical parameters and infrastructure.

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