

Performance Evaluation Management Model to Accelerate the Development of E-Government in China

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ABSTRACT

With the administrative reform progressively intensified in recent years, the information technology plays an important role in the public administration area in China. The Chinese leaders are using the information technology to strive and accelerate the process of E-government. The motivation of E-government is to enhance the managerial effectiveness, making more transparent policies, and decentralizing public administration. In order to evaluate the result of policy execution and the government ability of overseeing key activities, it would be useful to build a series of effective performance appraisal systems. In this paper, we put forward a novel performance evaluation management model, which integrates different participant roles, at different stages and optimized the model based on the characteristic of Chinese political architecture. The performance management model embeds key performance indexes (KPIs), and five participant roles. Particularly, we come up with the evaluation formula which is based on the role of the proportion of different roles.

Categories and Subject Descriptors

K.4.1-3 [Computing Milieux]: Computers and Society – *public policy, social issues, organizational impacts*; C.4. [Computer Systems Organization]: Performance of Systems – *measurement techniques*

General Terms

Management, Measurement, Performance, Human Factors, Standardization, Verification

Keywords

E-government, performance evaluation management model, administrative reform, key performance indexes.

1. INTRODUCTION

The E-government (Electronic Government, one-stop government, digital government, Electronic Governance) field emerged in the late 1990's as a context within which to share experiences among participants [1]. Over the past twenty years, E-government develops to certain maturity and its services penetrate into different levels of citizens.

Under today's Information and Communication Technology (ICT) rich environment, the requirement of society and the reform of government, various national governments and international

organizations pay close attention to the research of E-government which related to the theory and technology and even the applications [8] [9]. As far as we know, the main objectives of E-government encompass the government's transparency, increase of efficiency, improvement in the governmental decision-making ability and so on. Based on the E-government construction and to evaluate the ability of the government, the performance evaluation management model has served as the evaluation criterion for the related departments.

According to some research papers, such evaluation activities are referred as performance management. There is an idea of a new public administration emphasizing that "it can't be managed if it can't be measured", which implies the necessity of E-government performance evaluation [2]. The idea drives the development of performance management and applies itself to promoting the role of E-government performance evaluation management in the construction of E-government. In order to consider the quality of the construction of E-government in breadth and depth, there are some researchers who focus on the key performance indexes (KPIs) to improve and optimize the performance evaluation management [11]. The majority of previous papers in this area have put a lot of efforts into setting the KPIs for performance management (Hellang et al., 2012, Hyung Joon Moon et al., 2008). It gives enough thought to KPIs but neglects the framework of the model. However, there are some papers that introduce the framework of performance evaluation, the E-government organizational performance framework using response collected from the experts and the related departments [3][4][10]. Its limitation is lack of embedding the role of citizens and others, because the government is a service-oriented government.

There are different perspectives to define the electronic government (E-government) according to the weight on technology. The technological determinism and the social determinism each has different opinions on the E-government [5] [7]. In our investigation, from the perspective of technology, the technological experts attach importance to applying the technology to solve the related problem. However, from the perspective of regulation and law, they pay more attention to the humanization and rationality. In our opinions, it is feasible to combine the two determinisms together in some ways, since the E-government is a form of E-business in governance and refers to the processes and structures needed to deliver electronic services to the public (citizens, businesses and other interest groups), collaborate with business partners and to conduct electronic transactions within an organizational entity.

Therefore, based on the two drawbacks and two determinisms, we come up with the novel performance evaluation management model which integrates five participant roles¹, three evaluation

¹ Different participant roles include leader, public, performance office, appraisal object, responsible unit.

stages² and embeds the relevant KPIs. The five participant roles consist of the leader, public, performance office, appraisal object, responsible unit. On the other hand, the steps include three stages which are the planning phase, execution phase and end phase respectively. Furthermore, in order to quantify the evaluation mechanism, we combine the traditional mathematical reasoning and put forward the evaluation formulas according to the weight of different participant roles. The model designed should be interactive between different roles flexibly and it is able to renew the standard of KPI by the related units.

2. PERFORMANCE EVALUATION MODEL ARCHITECTURE

In this section, we overview the performance evaluation model architecture, every step has a corresponding processing unit in each role. It is valuable to illustrate that each stage is relatively independent but the participant roles are interactions knitted closely between them.

In the first phase, the roles of Assessment Unit (AU) and Appraisal Object (AO) provide the detailed index score and detailed function index grading respectively. The Performance Management Department (PMD) integrates the indexes which are taken from the AU and AO. According to the two indexes, the PMD sets assessment scheme, and forms an evaluation index system. At the end, the AO will receive the appraisal scheme from the PMD.

In the second phase, the core function is to monitor the assessment from the AU and AO. It plays an important role in the whole three phases and make them interact more closely. In the third phase, the PMD will collect all the related units's appraisal results and summarize them, finally, forming the final performance evaluation scores and rankings. The result can help the leaders to optimize the appraisal scheme and promote the development of E-government. The performance evaluation model architecture is shown below in Figure 1.

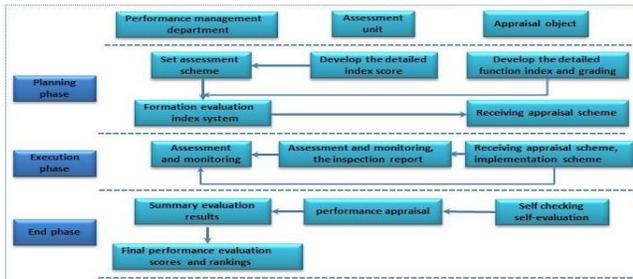


Figure 1. Performance evaluation model architecture

2.1 Performance Evaluation Business Flow

Based on the performance evaluation model architecture, we implement the business flow of the model which details the operational business flow. It adds two participant roles to the process of performance flow which is the leader and public. The role of public main objective is to apply the opinion of Government to Citizen (G2C) and Government to Business (G2B), they mean that all institutions become more transparent, which improves democracy and service. The details of the performance evaluation business flow are presented in Figure 2.

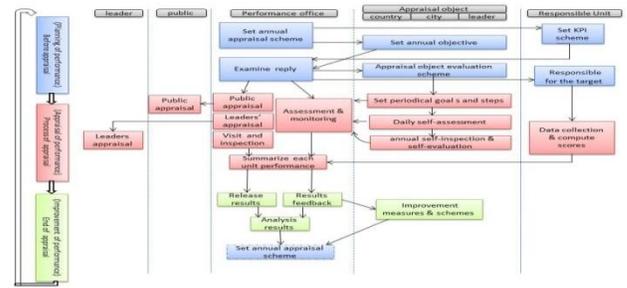


Figure 2. Performance evaluation business flow diagram

2.2 Implementation of Performance Evaluation Business

In this section, we emphasize the KPIs which we design according to the requirement of the responsible units in this model. We design the standard KPIs which consider the public appraisal, leader appraisal, appraisal result. The KPIs adopts the way of combining the quantitative indicators and qualitative indicators, which the quantitative indicators refer to computing the score based on the computational formula provided the data from the Data Collection Unit. Others, the qualitative indicators assign the responsible unit to compute the final result according to grading details which help the leaders make decisions. In the E-government field, we apply the fuzzy mathematics thought to consider the performance evaluation, and the thought supports about how to implement the performance evaluation business.

According to the regular procedure laws and regulations, there are some steps during the appraisal system. And also there are some participant roles who can take part in the appraisal system. In this subsection, we take three cases as examples to illustrate how to achieve different roles's score which is the public appraisal score, leader appraisal score and unit appraisal score.

Firstly, the public appraisal consists of committee member, retired cadre, specialist scholar, representatives and so on, different appraisal object formulate different score weight, respectively. Secondly, the public appraisal was set to be three levels which contain the satisfactory (100 scores) adequate (60 score) dissatisfaction (0 score). If the appraisal object gives up the opportunity of appraisal or chooses the selection as "not understood", it will be out of the appraisal result. The three levels are shown below in Table 1.

Table 1. Appraisal level

Level	Satisfactory	Adequate	Dissatisfaction	Not
Scores	100	60	0	not

According to different levels, we can get the different rate. The following formulation is to compute the corresponding level's rate.

$$Rate_x = \frac{m_x}{M_x - T_x} (x \in s, a, d, n) \quad (1)$$

Where the x is referring to the levels : satisfactory (s), adequate (a), dissatisfaction (d), not understand (n), the m_x represents the number of different level's votes, the M_x represents the total number of votes, the T_x represents the number of the level of "Not", the $Rate_x$ represents the different level's rate.

² Different stages include the planning phase, execution phase and end phase.

In order to get a more reasonable result, we should compute each level's average rate. The formula is shown below.

$$Aver_Rate_x = \sum_{x=s}^k (Rate_x * w) * 100\% \quad (2)$$

$(x = s, a, d, n)$

Where the $Aver_Rate_x$ represents the sum of average of different rate, and the parameter of w represent the weight given by appraisal units.

The public appraisal scores are based on the following formula.

$$p_score = \sum_{x=s}^k Aver_Rate_x * Score_x \quad (3)$$

$(x = s, a, d, n)$

Where the p_score is the public score from the appraisal, and the $Score_x$ represents the different level's score.

The public appraisal is to take the method of centralized review, random access, Internet survey. However, the Internet survey is on the government portal website and the result is out of the scores of public appraisal. The scores of public appraisal are in proportion counted into the sum of appraisal object, then the Performance Office ask for feedback from the Appraisal Object based on the result of public appraisal and put forward comments and suggestions so that it can be applied in the next year's index.

In addition, the leader appraisal is the one of the participant roles which consist of different level of leadership. The leader appraisal implements the centesimal system, classify the score into five classes. The five classes are presented in table 2 below.

Table 2. Score class

Class	1	2	3	4	5
Score	90-100	70-89	50-69	30-49	10-29

From the table 2, we illustrate that the first class mean finish the assignment perfectly, getting the best performance and social effect. By that analogy, we can get another four class descriptions.

In order to make the leader appraisal score digital, we transform the illustration into formula, which is shown below.

$$L_score = w_1 * \sum \frac{n_1}{N_1} + w_2 * \sum \frac{n_2}{N_2} \quad (4)$$

Where the w_1, w_2 represent the weight given by responsible unit, respectively. The n_1 and n_2 illustrate the score that get from the responsible unit, others is non-responsible unit, respectively. The N_1, N_2 represents the number of effective votes which belong to the responsible unit and non-responsible unit, respectively.

In the same way, the leader appraisal score is also counted into the sum score of appraisal object which is the same to the public appraisal score. All the participant roles' score is calculated, we should summarize the result of appraisal score. The appraisal result's formula is below.

$$u_score = kpi_score * p_1 + p_score * p_2 + L_score * p_3 - e_score \quad (5)$$

Where e_score is the result of examining by deducted points, and kpi_score is the score of KPIs. The p_1, p_2 and p_3 are assigned to the weight of each type of score. The proportion of the score can be adjusted according to the detailed requirements.

Above five formulas are formulated through each unit's regulation and rule, which consider fully the reasonableness and flexibility. Based on the formulas, it is so easy to transform the rule or regulation into the quantitative indicators and qualitative indicators so that the digital data can reflect effectively the appraisal result. It is persuasive that use the real data to prove the performance evaluation and make it easy to manage the result of the evaluation. It helps the Performance Office make the government more transparent, increase efficiency, improve governmental decision-making ability.

3. THE CHARACTERISTIC OF BUSINESS

The model is responsible for dealing with business between different relationships, it integrates different functional business modules. From a different perspective, the model can implement different functions including the process of management, interactive, assessment methods, content management, electronic flow and object of the application.

Firstly, the process of management of electronic performance model realizes the closed-loop management of performance evaluation work, instead of computing or releasing the result. The model divides the performance evaluation work into three phases including performance planning phase, performance executing phase and applying performance result phase. Importantly, it goes through all the phases when implements the performance.

Secondly, the content of the management of electronic performance model realizes the performance evaluation work is related to the management of the database KPIs, and realizes the management of structured data and unstructured data including various data, material, documents.

Thirdly, the electronic flow of electronic performance model makes the three phases interactive more electronically including the numerous business of office work and examining, in other words, the mode of an electronic substitute for the traditional manual cooperation and fused into the platform of E-government.

Fourthly, there are some assessment methods in the electronic performance model which supports the appraisal of KPIs, public, leader and so on, and provide the support for the application system in the different phases.

Finally, the electronic performance model of the object of application which is not only used by the unit in Performance Office, but also used by the related units or other roles who take part in the activity.

4. THE CHARACTERISTIC OF TECHNOLOGY

From the perspective of technology, it is provided with advanced architecture and integrating different applications.

The first of characteristic is continuation of data centralization, centralized management mode. The model will continue the current architecture of E-government. System construction will take effective measure to apply the model into the central server,

core switch and choose the application of advanced clustering technology to ensure the safety of data, improve the operational efficiency, reduce the expenses of expanding and upgrade, in addition, to reserve space for the development of the expanding business and scope of application .

The second of characteristic is existing systems seamlessly integrate e-government applications. It can seamlessly integrate e-government applications into the current system, it also can be convenient to use the corresponding function, when the civil servant login the application of E-government. The integration of application of the system is mainly represented in the following.

It can uniform resource management based on the building platform and help all applications for unified deployment of resources and rights management. Based on the E-government application portal platform, it can conveniently govern the uniform resources. Besides, the system is able to set up different types of appraisals, methods, modes and it is valuable to illustrate that the users can set up or add the appraisal unit, appraisal content, appraisal period, appraisal level, index weight which provides the flexible appraisal tools for modifying, at the same time, it can design different weight, relationship as well as make the characteristic invisible so that get more reasonable result of performance evaluation.

5. CONCLUSION

In this paper, we present the novel performance evaluation management model which integrates different participant roles and different stages based on the characteristic of Chinese political architecture and also embed the KPIs into the model based on the requirements, makes it more reasonable, scientific and well-balanced. This study helps the leaders or related units make a decision based on the performance result and rankings. We develop a performance evaluation model framework from the balanced perspective of integrating different participant roles, classifying different phases and embedding different KPIs into the model.

Through investigation, the previous related papers proposed the methods that KPI-based, civic values and service orientation, its limitation is lack of global concept. Since the E-government is to serve the object who is citizens, business, other groups, we should consider their roles in the E-government, especially the citizens and business.

Therefore, the model takes the aspects of KPIs, roles and architecture into considering, it not only makes the model perfect, but also it improves the interaction closely between different roles. Although we make an effort to develop completed methodology for measuring the E-government's performance evaluation, there still are some drawbacks in setting the regulation of KPIs which is needed to establish according to the related indexes. In addition, we can make an attempt to expand the model into other countries or regions. In order to address these limitations and realize this idea, we should make more further research in the future.

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