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E-government(EG) Information Service Quality (ISQ) Evaluation Lineage on Account of Big Data (BD) Technology

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Abstract: *As a community public service and government affairs, EG has a wide range of risks and huge risks. Facing this situation, EG ISQ evaluation urgently needs to be constructed, which can effectively solve the problem of ISQ evaluation and cut down the risk of e-commerce. On the other hand, EG involves not only the application of IT but also political issues such as power security and power sovereignty sensitive information. China's further opening up and reform, the transformation of government functions and modes of operation and other respects are in urgent need of the blossom and advance of EG. This text studies the construction of EG ISQ evaluation lineage on account of BD technology, focusing on the operation principle and related theories of EG ISQ evaluation. The data checkout proves that the EG ISQ evaluation lineage on account of BD technology has expeditous performance in the area of service quality evaluation.*

Keywords: *Big Data Technology, E-government, Information Service Quality, Evaluation lineage Construction*

1. Introduction

The blossom of EG is an important means for the government to boost the ability of public service and power synthetical governance. Guiding Ideology of EG ISQ Evaluation lineage Construction adhere to demand-oriented and application to promote blossom. Strengthen EG ISQ evaluation lineage construction to enhance government supervision and service capacity, boost administrative quality and efficiency to drive the overall industry, field and community information construction to promote the sustained, fast and vigorous blossom of the power financial and synthetical community advance. The EG ISQ evaluation lineage on account of BD technology is conducive to the advance of EG ISQ evaluation technology.

As for the study of BD technology, domestic and foreign scholars have carried out study on it. In foreign studies, SaetangW proposed a study model on account of TOE framework and DOI theory to study the payoff factors of BDT receiving in the Thai substance. Record were gathered by means of an on-line survey. A sample group of 300 IT employees from various Thai organizations was used. Fabric eqs model (SEM) was used to checkout the hypothesis. The consequences show that the statistics fitting between the study model and empirical data are: normalized Chi-square =1.651, GFI=0.895, AFGI=0.863, NFI=0.930, TLI=0.964, CFI=0.971, SRMR=0.0392, RMSEA=0.046[1]. GhallabH proposed the use of BD technology to detect abnormal occurrences in the Internet of Things, and developed a new model NRDD-DBSCAN on account of DBSCAN algorithm, which uses elastic dispersed data sets (RDD) to detect abnormal occurrences that impress the data quality of the Internet of Things technology. Nrdd-dbscan has been applied to three different N-dimensional data sets (2-D, 3-d and 25-D) with satisfactory consequences [2]. PertiwiDR proposes to use BD and Internet of Things technology to enter the mentality home. Traditional meters retrieve information manually from residential or industrial customers and charge manually. This handle is lengthy, hour expense and expensive for public facility suppliers. Approximately, this gave rise to the receiving of mentality mesh lineages for power source run and expeditous data dispose [3].

At the present stage, the main work of EG is to boost the background technology and the foreground, generally adopting the bureaucratic, single and isolated business dispose [4-5]. Therefore,

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it is urgent to boost the dispose and dispose of EG information, and build the EG ISQ evaluation lineage. If the evaluation lineage is complete, various evaluation work of EG can be effectively boostd [6-7]. The EG ISQ evaluation lineage on account of BD technology is conducive to the boostment of ISQ evaluation.

2. Design and Exploration of EG ISQ Evaluation Lineage on Account of BD Technology

2.1 BD technology

BD technology is a program public facility designed to deliberate, handle and abstract information from extremely intricate large data sets that traditional data dispose program would never be able to handle [8-9]. Many respects of life today do with BD dispose to deliberate large amounts of real-hour data and raise conclusions and predictions to cut down unborn risks.

The mathematical model can be used to accurately solve the value of data assets, and the final consequences can be obtained by dividing the data into threat levels and comparing with security levels. Its classification steps can be grouped into the sotto points, as revealed in Figure 1.

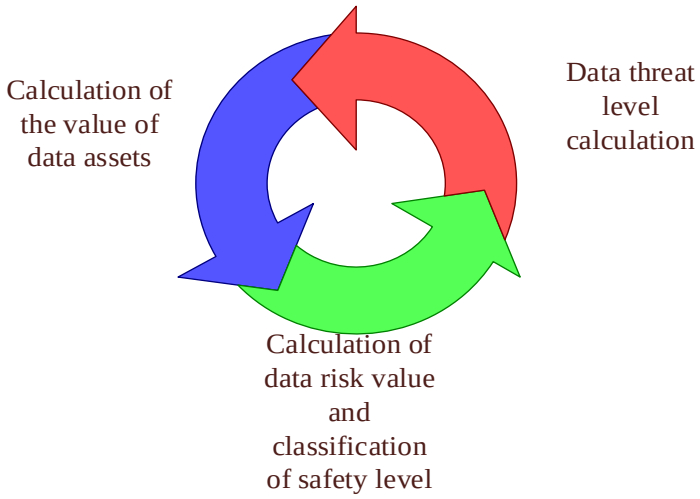

Figure 1: He classification of data security levels being grouped into three steps

(1) Calculation of data asset value

ISO27001 contains many attributes of data assets, such as confidentiality, integrity, availability, etc. [10-11]. The meaning expressed by this data attribute is whether the measured data meets the three safety data standards, which can be grouped into corresponding degrees. Formula (1) is listed in This text to calculate the value of data assets, and the specific formula is as below:

$$V(A) = W_c \times V_c + W_i \times V_i + W_a \times V_a \tag{1}$$

In the above formula, V(A) is on behalf of the asset value of data A; Wc, Wi and Wa represent the proportion of importance of the three security attributes of data to asset value, and the sum of the three is 1. Vc, Vi, and Va represent the asset value of the three security data attributes.

(2)Calculation of data threat level

The determination of data security level should first consider the threat level of data [12-13]. The threat level is on behalf of the probability of occurrence of security incidents and the degree of loss caused to the consequences. The threat level is divided in line with relevant classification standards, and the data is deliberated from three security attributes. The loss of data in terms of threats, and the probability of a threat. The algorithm formula of threat level can be calculated from the above analysis:

$$T(A) = (F_c \times T_c + F_i \times T_i + F_a \times T_a)/3 \tag{2}$$

In the above formula, T(A) is on behalf of the threat level value of data A; Fc, Fi, and Fa represent the probability of occurrence of the three security attributes, which can be expressed in the range of 1-5.

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Tc, Ti and Ta represent the possible threat degree of the three security attributes, which are also represented by 1-5.

(3) Data risk solving and safety level dispose

After the calculation of V(A) and T(A) is completed, the data risk value can be obtained:

$$R(A) = Round1[T(A) \times V(A)] \tag{3}$$

The R(A) solution synthetically deals with the threat level and asset value of the data. The calculation of T(A) and V(A) do withs synthetical consideration of safety attributes.

2.2 EG ISQ Evaluation Lineage on Account of BD Technology

Business models of EG are grouped into the sotto species in line with the main body:

(1) Government to government

There are various ways for governments to communicate with each other: between central agencies and other subordinate agencies, within departments, between departments, between departments and employees, and one of other departments [14-15]. This scope deals with collective meetings of departments and institutions, collective policies, such as the measurement, dispose and use of basic geographic information, such as population data, geographic information, resource information, etc.; Basic information that governments need to deal with each other in economic transactions, such as planning, general run, community statistics, departments, power affairs; Department information communication, such as emergency handling, information communication, etc. Department office program information run, such as OA lineage, documents, finance, archives, etc.

(2) Government versus enterprise

Government actions against enterprises include announcements, rules, regulations, various provisions issued by the government, and conditions do withd by various units for compliance behaviors [16-17]. The essence of "government to enterprise" is to provide necessary administrative services for enterprises to carry out economic activities as an administrative subject, and these services are in line with regulations and rules. For example, the government invests in an innovative and stable business competitive environment. At this hour, the service object is all kinds of enterprises, the service may be to provide the enterprise's office environment, policy conditions, etc.

(3) Government versus residents

The essence of the government for residents is that administrative units provide services for unit members [18]. Among the services, the rule states that residents can know how to carry out administrative procedures if do withd; Where is the position of leading departments, how to maintain community safety, and how to deal with natural disasters. There are also many civil rules, such as birth procedures, household registration, bicycle licenses, vehicle procedures and so on.

3. Study on the Effect of EG ISQ Evaluation Lineage on Account of BD Technology

In This text, analytic hierarchy handle (AHP) on account of BD technology is used to settle the weights of evaluation indexes, so as to carry out intelligent evaluation ranking.

Suppose there are n indicators, their importance is w1, W2... Wn. By pairwise comparison of their importance, the sotto N * N matrix is constructed:

$$A = \begin{bmatrix} w_1/w_1 & w_1/w_2 & \cdots & w_1/w_n \\ w_2/w_1 & w_2/w_2 & \cdots & w_2/w_n \\ \cdots & \cdots & \cdots & \cdots \\ w_n/w_1 & w_n/w_2 & \cdots & w_n/w_n \end{bmatrix} = (a_{ij})_{n \times n} \tag{4}$$

If I multiply my weight vector $W = (w_1, w_2, \cdots w_n)^T$ hours my A matrix, I get in line with matrix theory, n is the eigenvalue of matrix A, and W is its corresponding eigenvector.

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$$(A-nI)W=0 \tag{5}$$

The construction of EG ISQ evaluation lineage on account of BD technology adopts algorithm formula (1), (2), (3) to calculate the data risk value and divide the risk level; Formula (4) and (5) are used to classify the evaluation samples. Finally, it sorted in line with each sample data, attached the risk value of the data and the corresponding risk level, and then divided the levels on this basis.

Evaluation lineage:

(1) Construction of index lineage

This study settles three first-level indicators of EG information resource integration evaluation lineage on account of holistic governance: organization integration, information integration and service integration. In the construction of the integrated evaluation index lineage of EG information resources on account of holistic governance, the selection and determination of three first-level indicators are mainly the mapping of the core elements of holistic governance. In the handle of using analytic hierarchy handle and expert evaluation method to settle the weight of each level of indicators, the main consideration is given to the overall governance of each indicator: service integration is the core of the project, organization integration for organizational security, information integration for technical support. Accordingly, in line with the three first-level indicators, combined with the core idea of holistic run skills and measures, 20 second-level indicators are settled, including the emphasis on responsibility, trust, sharing, performance, budget and so on. The detailed indicators are revealed in the sotto table:

(2) Detailed rules for index scoring

Before the evaluation of each index element, the full score of 20 second-level indexes in this index lineage is 10 points. In the application handle, the factors under each secondary index should be scored separately first, and the total score is the score of the secondary index. Then in line with the weight of each index, the final score of each index is obtained.

(3) Determination of the weight of evaluation indicators

The index weight deals with the parameter harmonization which can reflect whether the index is more important or not in the evaluation. Evaluating index weight is a very important step. Whether the weight is reasonable or not impresss the score of the final evaluation to a large extent. If one of the factors changes, it may consequence in the final consequence of the combined weight. The weight needs to take into account the scientific nature and rationality, so as to obtain a more accurate value for the final consequence. At present, there are many ways to settle evaluation indicators. in line with the source of data and the algorithm of data, all methods can be grouped into three species: first, weighting method, hierarchical analysis and expert evaluation; Second, objective values, or entropy, variance, etc.

4. Investigation and Study Analysis of EG ISQ Evaluation Lineage on Account of BD Technology

All experiments were carried out in a cluster consisting of seven machines. The cluster uses Hadoop 1.0 and consists of one NameNode and seven Datanodes. Each node uses i5-2300 2.8GB CPU, 4-core 8-thread, 32GB memory, and Ubuntu 12.04 operating lineage.

Six groups of trial data were used, and the matrix dimensions were 1000×1000, 5000×5000, 10000×10000 and 1 5000×L 5000 respectively. 20000 * 20000250 * 25000. These trial data were randomly generated using the matrix generator described above. In this experiment, the block method in the dispersed method implemented by Hadoop is compared with the stand-alone algorithm. The trial consequences are revealed in Table 1(the horizontal axis is on behalf of the logarithm base 10 of square dimension, and the vertical axis is on behalf of the logarithm base 10 of execution exactitude).

Table 1: Checkout effect data display

Algorithm	30	60	90	120	150	180
Single algorithm	2.1	2.5	2.6	3.6	4.2	4.4
BD technology	1.4	2.5	3.4	4.3	5.0	5.5

It can be revealed from Table 1 that the exactitude of Single algorithm and BD technology in the checkout ranges from 30 units to 180 units, respectively, as revealed in the second and third lines of the table. It can be found from the data that the EG ISQ evaluation lineage on account of BD technology is more expeditous in the evaluation exactitude.

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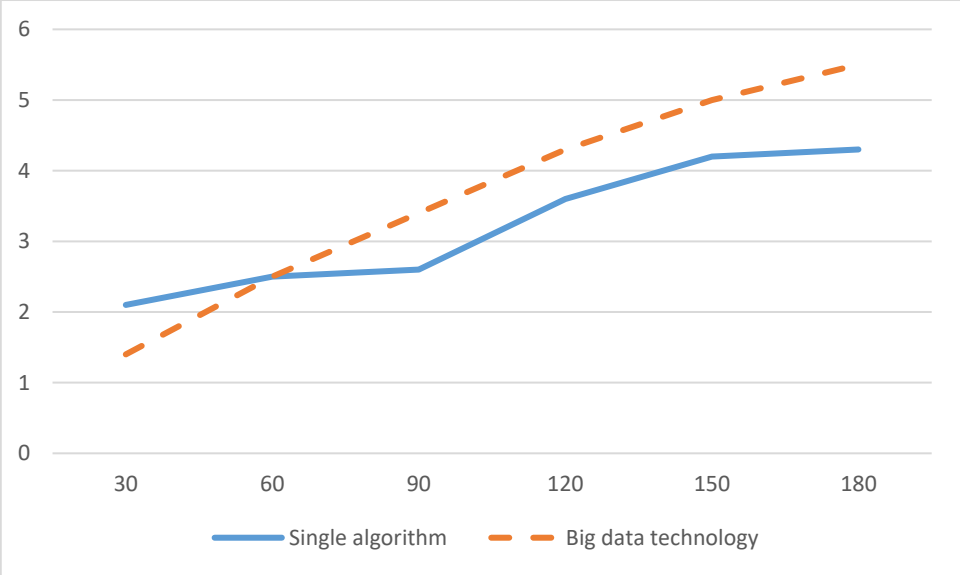

Figure 2: Checkout effect data display graph

Figure 2 reflects the data obtained when dispose the EG ISQ evaluation samples displayed by the stand-alone algorithm and the EG ISQ evaluation lineage on account of BD technology. BD technology has proved to be more accurate.

The data checkout shows that the EG ISQ evaluation lineage on account of BD technology shows a more advanced evaluation performance very expeditously.

5. Conclusions

The evaluation of ISQ reflects that there is no specific case that can form a lineage at present. Although the power ISQ evaluation lineage and administrative units are involved in the evaluation lineage, there are few study achievements at the present stage, so it is still necessary to carry out scientific and reasonable evaluation indicators and the construction and study of evaluation methods. The construction of EG ISQ evaluation lineage on account of BD technology has excellent evaluation algorithm in the area of information quality service.

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