

Discussion on the Application of Subjective Value Judgment in GEP Accounting System



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Abstract With the increasing importance of ecological and environmental protection and the determination of targets such as carbon neutrality and carbon peak, people are faced with an important problem, which is the conflict between the current Gross Domestic Product (GDP) as an indicator of economic growth and these targets, then a new indicator—Gross Ecosystem Product (GEP)—was discussed and implemented, and a corresponding intelligent accounting system was developed, both in theory and in practice, however, compared with GDP, the value of social final products can be determined by the market, but the content of GEP can not be determined by the market. That is to say, GEP accounting has part that can be determined by market, and can be realized by objective data intelligent collection and accounting system similar to GDP accounting. There are also parts that can not be determined by the market, which need to be determined by subjective value judgment. The part that can not be determined by the market is not reflected in the current GEP accounting system. The current system mainly continues the design of the GDP accounting system, this is clearly not enough to meet the actual needs. This paper discusses the feasibility of standardization of subjective value judgment and the feasible scheme of applying value judgment to GEP accounting system through preliminary investigation. Specifically from four aspects to explore: 1. Current GEP accounting system for Feature Analysis. 2. Standardized design of value judgment for the parts of GEP accounting that can not be valued by the market. 3. This paper discusses how to provide the interface of subjective value judgment on the GEP Objective Data Intelligent Collection and accounting system and the relevant technology. 4. The application scheme of value judgment in GEP accounting system is proposed.

Keywords GEP · Value judgments · Accounting system · Forth keyword · GDP

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Gross Ecosystem Product (GEP) is a measure of the state of an Ecosystem. It is the sum of the values of the services and well-being that an Ecosystem provides to society and humanity. In 2020, Zhejiang province issued the standard of GEP Accounting Technology for terrestrial ecosystems [1]. The GEP Chinese Academy of Sciences has carried out the GEP Accounting in Qinghai, Sichuan, Guizhou, Yunnan, Zhejiang and Guangdong provinces. The city of Shenzhen has established a “1 + 3” GEP accounting system to fully apply GEP to government performance appraisal, while Lishui city in Zhejiang province has established a mechanism to implement GEP accounting, which put the GEP accounting “Into the planning, into the assessment, into the project, into the transaction, into the monitoring” [2].

1 The Characteristics of the Current GEP Accounting System

At present, the main characteristics of GEP accounting system are as follows: first, the reliability of the results of the accounting is not high, the collection of some data is too subjective, there is no recognized unified standards, and GEP accounting is mainly applied to regional accounting, it is also not possible to compare between different localities; second, accounting technology is lacking, the scope of GEP accounting is too wide, accounting content has some serious alienation, non-structural data monetization has greater difficulties; third, the economic trend of GEP accounting. Although it is difficult to identify, quantify and monetize the value of ecosystem services, however, it is urgent to evaluate the value of ecosystem services, such as asset-based management, ecological compensation and paid use of ecosystem services [3]. The utility of the non-marketable part of GEP accounting is strengthened after the introduction of ecological compensation mechanism, and the GEP accounting system can not show the objectivity of this part.

2 Standardized Design of Value Judgment on the Part of GEP Accounting that Can not Be Valued by Market

“In 2013, Ouyang Zhiyun and Zhu Chunquan put forward the concept of ‘Gross ecosystem product’ (GEP). Ouyang Zhiyun’s research group established a GEP accounting system and accounting model from three aspects: material products, regulatory services and cultural services, and developed an assessment method based on the accounting of ecosystem values and functions” [3]. This conclusion played a key role in the promotion of GEP Accounting, however, there are many problems in the concrete accounting, such as the disunity of standards and methods. The reason is that there are some products and services in the three aspects of material products, regulatory service products and cultural service products, in particular, the value of

regulating service products can not be realized by the market, but it must be monetized, otherwise it can not be GEP accounting, the final products and services that can not be achieved by the market can only be achieved by subjective value judgments, that is, to achieve objective or standardized subjective results. The general approach is to set up a set of indicators for data collection, Then the collected data are digitized and scored. The result of scoring is the standardized result of value judgment.

3 Subjective Value Judgment Interface and Relevant Technology Established on the Objective Data Intelligent Collection and Accounting System of GEP

The design of the platform of subjective value judgment should consider two main problems: one is who makes the value judgment, the other is how to ensure the objectivity of the judgment result. Only by solving these two problems can the standardized value judgment be integrated into the GEP objective data intelligent collection and accounting system, and the consistency between the objective data of GEP marketization and the subjective data of GEP value judgment be realized. New technologies offer viable alternatives to these two problems. The advent of big data and cloud computing means that we don't have to be limited in our choice of value agents, when people judge the value of an economy and society, they can approach the whole sample infinitely. The result of people's judgment is not through filling in the questionnaire but through self-portrait of their own behavior, so as to make the results more objective. The distributed accounting system of blockchain can make every selection node irreversible and unmodifiable, so that we can make sure that the behavior of the judge is not intentional. In addition, the whole judging process can be completed by process automation (RPA) technology. It is a simple problem to provide the interface of subjective value judgment on the GEP objective data intelligent collection and accounting system.

4 Application of Value Judgment in GEP Accounting System

In contrast, the difference between the gross product of an ecosystem (GEP) and the gross domestic product (GDP) is that GDP is entirely up to the market to determine the value of all end products and services throughout the economy and society, while in addition to the market-determined part of the accounting scope of ecosystem gross domestic product, there is also a part that has been determined by subjective judgment, and this part belongs to the category of value judgment. Thus, a GEP accounting system must be designed differently from GDP. Based on the above analysis, the GEP accounting system can be designed in three parts:

4.1 *The Part of Market Value Judgment of GEP Accounting Data Intelligent System*

The part of market value judgment of GEP accounting data intelligent system is mainly through the system, the value of urban ecosystem services will achieve accurate accounting. A complete system of GEP accounting, mainly includes a leadership (GEP Accounting Implementation Program), a standard (GEP accounting local standards), a set of statements (GEP Accounting Statistical Statement System) and a platform (GEP Automatic Accounting Platform). The user enters the address of the system in the browser, logs into the operating system, makes the operation setting of the permission to the system user, the role assignment and the background administrator account creation, and inscribes the GEP Accounting Report Management, view and edit operations. This system has realized the routine management, the user authority management (the administrator management, the Administrator Log, the role group), the GEP Accounting Local Standard Management, the GEP Accounting Report Management. Among them, for the management part of the system background, the data can be added, customized view, modify, delete and batch delete, and can export data, customized display; General management mainly includes the basic configuration of the system (including site name, version number, IP...), administrator's personal data, as well as the record and management of the upload of the attachment; user rights management mainly for the background administrator to add, administrator's rights to group settings, administrator log, the local standard management of GEP accounting mainly aims at adding, editing, deleting, displaying and exporting the local standard data of GEP accounting GEP Accounting Report Management: Mainly for GEP Accounting Report to add, data editing, data deletion, data display and data export. In general, the idea of this part is not much different from the GDP accounting system. The database table design part of this section gives the following example (Tables 1, 2 and 3):

Table 1 Physical table name: kj_citys, logical table name: GEP accounting local standard management table

Database fields	Database type (field length)	Notes
id	int(11)	ID
operator	varchar(50)	Operator
name	varchar(50)	City name
attachfile	varchar(255)	To account for the description of local standards
fdate	date(0)	Publication date
createtime	bigint(16)	Create time
updatetime	bigint(16)	Update time

Table 2 Physical table name: kj_reports, logical table name: GEP accounting report management table

Database field	Database type (field length)	Notes
id	int(11)	ID
operator	varchar(50)	Operator
name	varchar(50)	City name
attachfile	varchar(255)	Quarterly accounting report
datafile	varchar(255)	Quarterly accounting data
quarter	varchar(50)	Quarter
tdate	Date(0)	Date of submission
createtime	bigint(16)	Creation time
updatetime	bigint(16)	Update time

Table 3 Physical table name: kj_admin, logical table name: Background administrator table

Database field	Database type (field length)	Notes
id	int(10)	ID
username	varchar(20)	User name
nickname	varchar(50)	Nickname
password	varchar(32)	Cipher
salt	varchar(30)	Code salt
avatar	varchar(255)	Head portrait
email	varchar(100)	E-mail
mobile	varchar(11)	Mobile phone number
loginfailure	tinyint(1)	Number of failures
logintime	bigint(16)	Login time
loginip	varchar(50)	Login IP
createtime	bigint(16)	Creation time
updatetime	bigint(16)	Update time
token	varchar(59)	Session ID
status	varchar(30)	State

4.2 The Part of Subjective Value Judgment of GEP Accounting Data Intelligent System

The subjective value judgment part of GEP accounting data intelligent system is mainly through experts to score by using big data, cloud computing and other emerging technologies to achieve unstructured database construction, data subsistence and visual collation, combined with the use of analytic hierarchy process (AHP), Delphi method, neural network, etc. to achieve the digitizing subjective

judgments, furthermore, the part of the total value accounting of ecosystem that can not be summarized by market can be quantified and summarized. Specifically, it includes a GEP Evaluation Index System, a GEP index scoring system, a GEP non-structural data visualization reporting system and a GEP intelligent accounting platform. The operation of each platform is carried out in the browser, data collection, calculation and analysis reports are carried out in the cloud, the index design and scoring system can be extensible, and can have self-learning function, the evaluation results of experts and the overall results of GEP accounting are verified, and then the overall image of experts' evaluation behavior is realized, so that the subjective judgment approaches the reality, and the part of GEP's subjective value judgment is standardized.

4.3 The Feedback Part of GEP Accounting Data Intelligent System

Different from GDP, only the part of market value judgment can achieve the monetization of final product and service in GEP accounting, and the monetization of the part of subjective value judgment has strong artificial factors. It is objective only in the form of the performance, that is to say, it is an objective form of the performance of the subjective results, but in essence, it is still an artificial subjective judgment. Therefore, if we want the results to reflect the objective reality, it must have a feedback system to verify and modify it. That is to say, there must be a verification system that can verify and self-correct the results of GEP accounting. The feedback part of GEP accounting data intelligent system is to achieve this function, mainly includes three parts: the first one is a system of judgments that can be modified (which can reflect the human feelings and sustainable development), the purpose of the adoption of GEP index is to achieve the aim of the sustainable development of the human. And GEP is not a pure ecological index, which not only considers the protection of ecosystem, but also considers the development of human economy, it has the inherent unity of contradictions. We can not simply summarize the accounting results of the market value part of GEP accounting data intelligent system and the subjective value part of GEP accounting data intelligent system as the final GEP, we must coordinate between the two needs to achieve the final result, and the standard of coordination is a system of indicators that can reflect human feelings and sustainable development; and the second one is a platform for data collection based on the evaluation system, using technologies such as big data, cloud computing and artificial intelligence to make data collection intelligent, the platform process design can integrate the technology of block chain and process automation into it, and realize the self-portrait of human feeling, remote sensing technology can be used to collect ecological data and self-portrait of the ecosystem. The third one is the GEP data conversion, connection and result presentation system, which can realize the integration of the market value part of GEP accounting data intelligent system and the

subjective value part of GEP accounting data intelligent system to build the overall platform database, and standardize the structured data of the market value part of GEP accounting data intelligent system and the unstructured data of the subjective value part of GEP accounting data intelligent system, finally, the final GEP results are calculated through the GEP accounting system and accounting model which are constructed from material product, regulating service product and cultural service product.

In a word, the part of the Gross Ecosystem Product (GEP) which can not be valued by the market can only be realized by subjective value judgment. “How to select effective and reasonable methods to evaluate the effect of comprehensive ecological protection in a certain administrative region has become a problem worth discussing” [4]. This process needs the help of big data, cloud computing, blockchain, artificial intelligence and other technologies to be able to achieve, which needs not only the support of the underlying information technology, but also the support of traditional disciplines such as statistics and economics.

Funding Statement 2023 college students innovation and entrepreneurship training program of Liaoning Institute of Science and Technology_Study on the Implementation Path of GEP Accounting in Liaoning Green Economy Pilot Area (202311430026).

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