

Thinking on the Trend of Environmental Information System

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Abstract. Environmental information system (EIS) is an important aspect of environmental protection strategy. After analysing the present situation of EIS, this paper discussed some suggestions over the development trend of EIS, among which data sharing is the foundation of building a well-designed environmental information system. EIS should also leverage innovative technology, such as big data, artificial intelligence and cloud computing, in order to provide strong technical support for the environmental decision-making.

1. Introduction

In recent years, china government is encouraging a coordinated development cross environmental protection and economy, with the objective of building an environment-friendly society. Environmental information system (EIS in short) is an important aspect of environmental protection strategy. In the field of environmental protection, information technology is mainly used in environmental quality monitoring and management, pollution source monitoring and management, environmental statistics, environmental evaluation, as well as ecological protection and management[1]. The implementation of pollution control and the disclosure of environmental information is difficult to be done without the collection, processing and support of the environmental information supported by the EIS.

The EIS collects environmental information, transforms and processes them based on intelligent algorithm model. Based on the output of the system, the environmental decision makers carry out environmental evaluation, prediction and act accordingly. It combines computer technology, network technology, database technology, mathematical model and other technologies to provide technical and information support for environmental protection and management. The basic functions of the EIS include the collection, the storage, the processing of environmental information, as well as the results output in the form of reports and graphics that provide the basis for environmental decision makers[2].

2. The Present Situation of EIS in China

After years of efforts, China's EIS has achieved remarkable results[3]:

1. In terms of basic network, by leveraging the office automation system and the EIS, the environmental protection departments at all levels have built a satellite communication network covering the national provincial environmental protection bureau and some urban environmental protection bureaus. Most of the provincial environmental protection bureaus have set up application system to provide a large amount of environmental information and government policy information to



the society. In other words, the interactive communication between the environmental information and the public has been implemented.

2. In the field of application system, multiple EISs with business focus on environmental statistics, pollution source management and environmental monitoring have been initially built under the guidance of the State Environmental Protection Administration. These EISs are acting as the comprehensive information platform for environmental management, information resources sharing and service.

However, due to the disunity of the data format and technical architecture, data is difficult to share with each other. Therefore, the public cannot gain enough benefit from these systems. It is necessary to integrate data from water conservancy, meteorology, land, agriculture, forestry, social economic and other departments, as well as social data produced by enterprises, individuals and so on[4]. Meanwhile, the EIS construction among enterprises may not be optimistic. The enterprises are relatively lagging in environmental data sharing perspective, because some enterprises are unwilling to invest in environmental protection, especially in the EIS. This makes the environmental protection more difficult as the government cannot get efficient information from the public due to lack of EIS construction.

3. The Trend of Environmental Information System

3.1. Speed up the Application of Big Data Technology

Big data integrates the seemingly unrelated, fragmented information in environmental protection as the basis of data sharing[4]. The usage of big data related technologies, such as database, artificial intelligence, simulation technology as well as internet technology, will provide the environmental protection with an integrated system for environmental decision makers.

The key points of applying big data technology in EIS are as follows:

1. The big data processing technology, which breaks through the limitations of traditional data collection and processing, converts these heterogeneous data into appropriate formats and types, and applies these data to environmental decision-making.

2. Modeling and analysis is the core technology of big data. It uses a new generation of machine learning, artificial intelligence and other technology to implement application innovation and provide personalized services for environmental decision makers.

3. From the technical architecture point of view, the best practice is that EIS shall be constructed on top of cloud computing platform featured with virtualization, which can solve the poor scalability and low resource utilization of the traditional EIS technology architecture.

3.2. Build Cloud Computing-based Environmental Information Service Platform

Environmental information service platform is becoming an important part of environmental protection strategy. With the increasing attention on environmental problems, the demand for environmental information sharing services is becoming more and more urgent in the public.

It is necessary to establish a cloud computing-based environmental information service platform, with the objective of providing online interactive service on environmental information to the public. With help of such online service platform, for one thing, the platform directly provides all kinds of users with authoritative, reliable and timely updates of environmental information. For another thing, it is necessary to encourage and support the rich environmental information resources provided by relevant professional enterprises, which is capable to develop new value-added environmental information services, such as tourism, and so on[5].

3.3. Some Notices on EIS Construction

To achieve the objective of environmental protection, EIS shall collect and process proper data to ensure the integrity, accuracy and consistency of environmental information. The leveraging of innovative information technology, such as big data and internet technology, will help establish a

standard EIS foundation for applications such as pollution source monitoring, ecological protection and so on. In order to provide scientific decision support for environmental protection, an environmental data collection and processing mechanism shall be built (Figure 1)[6], which may include large amounts of real-time accurate data collection, information sharing and integration, and quantitative and qualitative analysis etc.

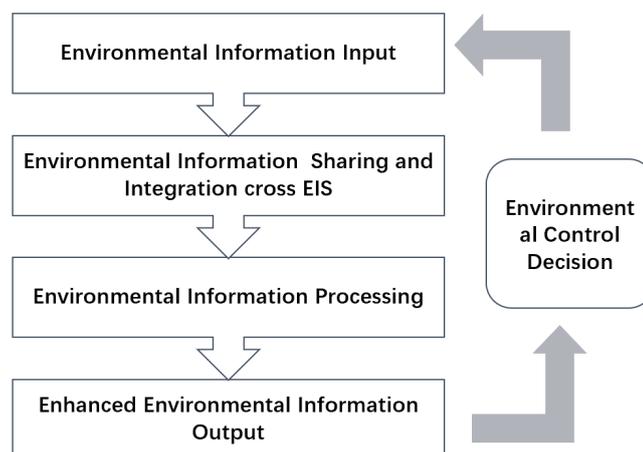


Figure 1. Relation between environmental information processing and environmental protection decision

Most successful enterprises in the global have proved that an effective integration of environmental information into the management information system of the enterprise is one of the key means to improve the efficiency of enterprise management. This can not only respond efficiently to the changes in environmental related regulations, but also help to improve the influence of the enterprise and gain new business opportunities. EIS can help to transform the traditional manual form of all kinds of reports into automatic generation of various standard environmental protection reports, making environmental protection more predictable and scientific[6]. Besides, issuing environmental notices and announcements through EIS also facilitates the exchange of environmental information between enterprises and government departments. EIS also becomes the main channel for the disclosure of environmental information, as well as the main environmental protection regulations[7]. The enterprise can implement the EIS, manage its environmental data, assess its environmental performance, and provide decision support.

4. Conclusion

With the rapid development of economy, more and more attention has been paid to environmental protection by the government and enterprises. The establishment of environmental information system provides an important way to solve environmental problems. Some EIS may not function well due to reasons such as data format disunity. Some enhancements shall be done in order that these EIS can service the government and enterprise better, among which data sharing cross EIS is the basis for building a well-designed environmental information system. More other innovative technology such as big data, artificial intelligence and cloud computing, are suggested to be used by EIS to provide strong technical support and provide scientific decision support for environmental management.

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