



# Research on Informatization Construction of Enterprise Performance Management Based on “Internet+” Management Information System

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**Abstract.** Under the background of the current “Internet+” era, the traditional enterprise performance management model has problems such as insufficient overall planning, poor departmental coordination, and single service function, which can no longer meet the needs of enterprise development in the new era. With the rapid development and wide application of network information technology, enterprise managers have gradually realized the importance of establishing an enterprise performance management information system based on the “Internet+” management information system. Complete the design and construction of the performance management information system of the enterprise. A comprehensive solution to realize enterprise performance management in the form of MIS is proposed. The system will support the functions of performance planning and setting, process supervision and review, performance evaluation implementation, performance summary analysis, etc., based on the KPI performance management method, standardize and standardize the goals and plans of each department of the enterprise to formulate corresponding evaluation plans and plans. The evaluation process meets the needs of the current corporate strategic management, business management and basic executive layers for the improvement of efficiency, scientificity and effectiveness of performance management, and improves the quality and level of refined management within the enterprise. And with the new thinking of enterprise performance management under the background of “Internet+”, it provides practical and theoretical basis for the development of enterprises to be more stable, sustainable and healthy.

**Keywords:** Internet+ · Performance Management · MIS · Javaweb

## 1 Introduction

At present, my country has entered a new era of socialism with Chinese characteristics, and it is also a new stage of high-quality social and economic development. With the continuous advancement of my country’s deepening reform process and the continuous optimization and adjustment of the industrial structure, the market environment

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N. Radojević et al. (Eds.): ICAID 2022, AHIS 7, pp. 105–116, 2023.

[https://doi.org/10.2991/978-94-6463-010-7\\_13](https://doi.org/10.2991/978-94-6463-010-7_13)

will inevitably show ups and downs, and all enterprises in this environment will also face the test of survival and development or decline and destruction. Only by improving the competitiveness of the enterprise in a timely manner and closely integrating the enterprise development strategy, management and market development trends, can an enterprise become a truly competitive enterprise with market value and develop healthily and steadily. As the cornerstone of enterprise development and growth, enterprise performance management plays a huge role in promoting the competitiveness of enterprises in all stages of enterprise development. Enterprise performance management can benefit us both from the perspective of the organization as well as from the perspective of managers and employees. First of all, the implementation of performance management in enterprises can provide the necessary basis and evaluation criteria for the promotion, incentive and punishment of employees. Secondly, the performance planning, coaching, implementation, assessment, feedback and other links covered under performance management can effectively improve the accuracy of the internal control of the enterprise and increase the effectiveness of enterprise management. Third, through the decomposition and refinement of performance goals, the improvement and promotion of individual performance is clearly defined, and the overall performance of the organization is finally improved, making performance management an important means to ensure the realization of the organization's strategic goals [9]. The enterprise effectively decomposes the strategically high goals or plans to various business departments and employees, including the leaders or managers of the enterprise, and relies on good performance management methods to stimulate the enthusiasm of each employee to a certain extent, Initiative and creativity, enabling all business units and employees to work towards common organizational goals. At the same time, through the monitoring of the implementation process of the performance goals of each business department and each employee, as well as the assessment of the performance results, the enterprise managers can accurately and effectively understand the completion of the organizational goals, and can also timely detect unfulfilled cause and solve it. In addition, performance appraisal can also screen out outstanding employees in a scientific, reasonable and fair way, and eliminate employees who are not suitable for the development of the enterprise. The purpose of effective human resources makes the development of enterprises a virtuous circle.

Enterprise performance management is an inevitable demand for the improvement of the internal control and management level of enterprises. More and more enterprises want to realize the implementation of enterprise strategy and the improvement of business performance by establishing a performance management system, and help enterprises to obtain a lot of market value competitiveness. However, the current implementation effect of enterprise performance management is not obvious. Many enterprises only show some characteristics of performance management, only performance appraisal, which is mostly adopted by the personnel department of the enterprise. Fill in the form and score method to complete the staged assessment. The entire performance appraisal procedure is also a mere formality, and cannot achieve the real appraisal purpose, let alone performance management. In view of this, this paper believes that the design and construction of enterprise performance management information system should be completed by combining network information technology with enterprise performance management,

taking JavaWeb application development technology as the core, and collaborating with Struts2 framework. With the advantages of convenient, efficient and low-cost application of network information technology, the automatic operation of enterprise performance management is realized, and the overall planning and process reorganization of enterprise performance management are realized in the form of management information system (MIS). Combining process management and result assessment to build a comprehensive enterprise performance management system to achieve the upgrade and reform of enterprise performance management.

## 2 Introduction of Key Technologies

### 2.1 JavaWeb Technology

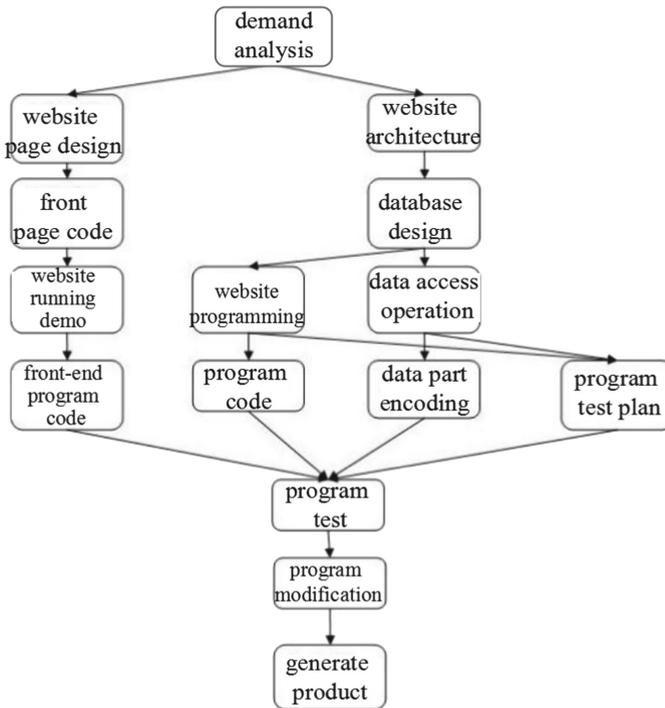
Web is an application architecture based on the Internet. It provides users with multimedia information services with hypertext, hypermedia and hypertext transfer protocol as the main technical means. This kind of service is mostly realized by web application, which can be understood as a web-based information processing system, which is established according to two different models, namely the information processing model and the information transmission model [2]. Among them, the information transmission model is a traditional web site, all information content is presented by a static web page written in HTML language, which has a single function and cannot realize human-computer interaction. The information processing model uses C, C++, Java, PHP and other object-oriented languages to build a Web server with complete information processing functions, so as to realize the construction of human-computer interactive and dynamic Web sites.

JavaWeb technology is the core technology to realize dynamic Web application development with Java language. From the birth of Servlet technology to the establishment of JSP technical specifications, and the subsequent application of a large number of design and development architectures, JavaWeb technology has gradually formed a set of related systems to provide convenience for the design and development of Web applications. A complete Java web application is usually composed of many components, generally composed of presentation layer components, control layer components, business logic layer components and data access layer (or persistence layer) components, as shown in Table 1. In addition, each component of a Java web application needs to be declared in a configuration file in XML format, and then packaged and deployed to a Java web server (such as Tomcat) to run [6].

The development process of Java Web application will follow the basic principles of Web development. As shown in Fig. 1, the Web client (front-end) and Web server (back-end) are designed and developed separately. Front-end development involves layout design, content design, animation design, etc. Common tools include Adobe Illustrator, Adodb Photoshop, Flash MX, HBuilder, WebStorm, etc. The back-end development is mainly to complete the realization of system functions and the construction of the system operating platform. These include the design and development of website dynamic programs, and the construction of database application models. Common tools include Eclipse, IDEA, and PowerDesigner.

**Table 1.** Components of each level of a JavavWeb application (Original)

JavaWeb contains all levels	components
presentation layer	HTML, JSP pages
control layer	Servlet
business logic layer	JavaBean or EJB
persistence layer	JDBC, Hibernate



**Fig. 1.** Java Web Application Development Flowchart (<http://www.bubuko.com/infodetail-2883531.html>)

## 2.2 MVC

MVC is the abbreviation of Model View Controller, which represents model, view and controller respectively. The three are combined to form a software development mode to realize the dynamic design of the program, simplify the subsequent modification and expansion of the program, and increase the reuse of some programs sex. As a development concept, MVC is widely used in the design and research of current software. The core idea of MVC mode is layered design, that is, in the development process, each functional module of the system is divided into layers, and data transmission and command interaction are completed between each layer through the API data interface, so

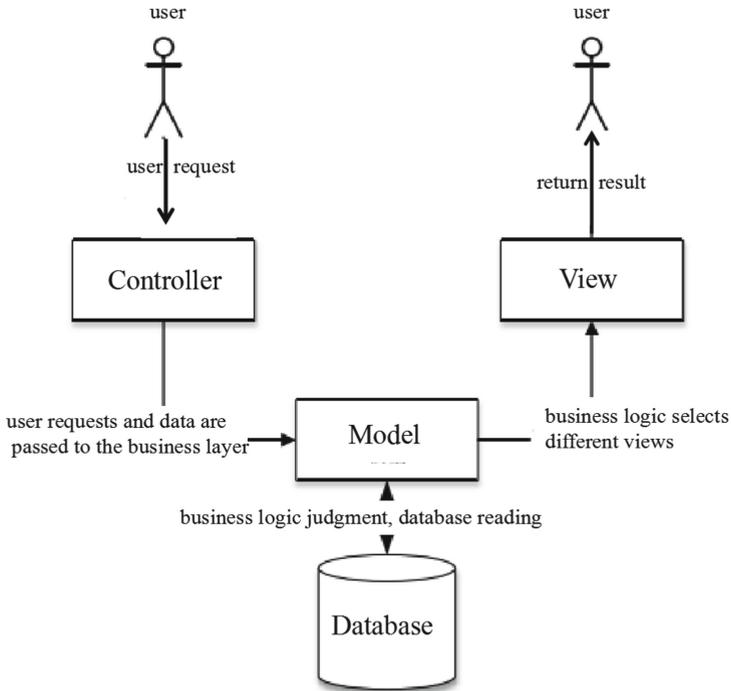
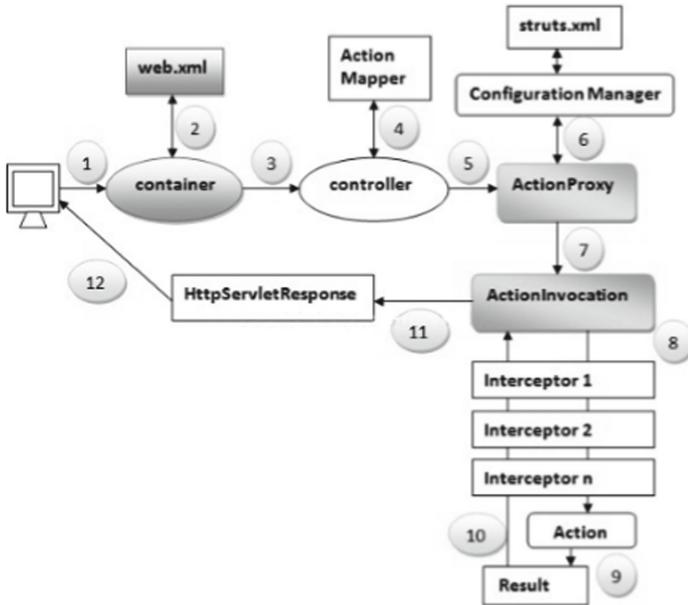


Fig. 2. How the MVC pattern works (<https://www.php.cn/faq/451435.html>)

that each layer is relatively independent and have different functions. Compared with the traditional software development mode, the MVC mode has obvious advantages such as low coupling, high reusability, and fast development speed [4]. As shown in Fig. 2, it is the working principle of the MVC pattern. The view layer, the user interface, is responsible for accepting user requests and displaying the corresponding results of business logic as feedback to users. The controller is responsible for forwarding the needs of users, and calling different business logic for processing according to different requests of users. The model layer will establish a mapping relationship with the underlying database server, each of which corresponds to a table in the database, which is convenient for users to complete various operations on the data.

### 2.3 Struts2 Framework

Struts, the general program code that plays a supporting role in the program, Struts2 is based on the Struts1 framework and integrated with the WebWork excellent framework upgrade [7]. As the support technology of the typical MVC development framework for web applications on the J2EE platform, Struts2 is favored in the actual development process due to its advantages of light weight, scalable process, and support for multiple view display technologies. As shown in Fig. 3, it is the working principle of the Struts2 framework, in which Struts2 takes the Servlet technology as the core and implements Web applications with the help of label definitions. The filter (FilterDispatcher)



**Fig. 3.** The working principle of the Struts2 framework ([https://blog.csdn.net/TheOne\\_JustPass/article/details/88378420](https://blog.csdn.net/TheOne_JustPass/article/details/88378420))

under the Struts2 framework converts the user request into a tag form and transmits it to the ActionProxy. After finding the corresponding Action class through struts.xml, ActionInvocation calls the Action through the proxy mode and returns the result.

**2.4 Development Environment**

Complete the configuration and deployment of the development environment according to the system development requirements and the use requirements of the above-mentioned key technologies. The overall development of the system is based on the Linux operating system, CentOS is selected as the version, Java is selected as the basic development environment, the JDK version of the development kit is required to be 1.6 or above, the Web server is selected as Apache Tomcat 6.0, the Java integrated development tool is selected as Eclipse 2015, and the database is selected as Oracle 11g. After the installation and configuration of the above software systems one by one, the establishment of the system development environment is completed. In Eclipse, by creating a new Dynamic Web Project, adding the jar file under Struts 2.0 lib to the construction path of the project, and completing the configuration of the web.xml file, create a new struts.xml file to complete the integration of the Struts2 framework Web project [1]. Then, the connection to Oracle data is realized by creating a JDBC connection database class JDBCManager.java. The key code is shown in Fig. 4, in which the Oracle driver, URL address, USERNAME username and PWD password are defined under JDBCManager.java to facilitate subsequent design and development. Through the introduction of the above key technology theory, the overall environment of system development, the

```

package com.hyw.util;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.PreparedStatement;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.sql.SQLException;
public class JDBCManager {
    public final static String DRIVER= "oracle.jdbc.OracleDriver";
    public final static String URL= "jdbc:oracle:thin:@localhost:1521:huang";
    public final static String USERNAME= "hyw";
    public final static String PWD= "hyw";
    public static Connection getConnection(){
        Connection con= null;
        try {
            Class.forName(DRIVER);
            con= DriverManager.getConnection(URL, USERNAME, PWD);
        } catch (ClassNotFoundException e) {
            e.printStackTrace();
        } catch (SQLException e) {
            e.printStackTrace();
        }
        return con;
    }
}

```

Fig. 4. The Struts2 framework completes the key code for Oracle database connection

configuration of related software and tools are determined, and the technical feasibility of the overall project of the enterprise performance management information system based on Web technology is also clarified.

### 3 Demand Analysis

#### 3.1 System Requirements Analysis

The enterprise performance management information system based on Web technology will take enterprise performance management as the design blueprint, fully consider the real needs of enterprises in the actual application process, plan and reshape the process of enterprise performance management, and complete the process with the help of network information technology. Online virtualized presentation replaces traditional manual operations and enhances the efficiency of information flow and analysis and processing in enterprise performance management. The use of the enterprise performance management information system will cover enterprise managers and all employees, and effectively combine the enterprise's strategic performance goals with each individual's performance planning. Based on the "people-oriented" design concept, it will focus on stimulating the work of employees at all levels of the enterprise. Positivity, emphasizing the high degree of unity between personal performance and corporate strategic performance, and creating a good working atmosphere within the enterprise. For performance appraisal, the core of enterprise performance management, the system will automatically conduct a comprehensive performance appraisal according to the completion of employees' work tasks, and use various analysis and statistical tools to grasp the performance appraisal information of different employees in time, so as to facilitate

the human resources department and the management of the enterprise completes the follow-up evaluation and rewards and punishments [8]. At the same time of performance appraisal, certain management methods will also be integrated, and the internal management and control plan of the enterprise will be adjusted in time according to the results of the performance appraisal, so as to further improve the enterprise management system.

The enterprise performance management information system will assign permissions according to different users and different roles in the enterprise. Common users include ordinary employees, leaders of other departments, leaders of human resources departments, and enterprise managers. Because enterprise performance management belongs to the category of human resource management, the authority of the leader of the human resources department should be different from that of the leaders of other departments. Ordinary employees, as the largest user group of the system, are mainly used to obtain performance goals, participate in performance evaluation, query evaluation results, and analyze and summarize information. The main function of leaders of other departments is to comprehensively supervise and manage the employees of their departments compared with ordinary employees. The authority of the leader of the human resources department lies in the overall supervision and management of the performance of the enterprise, timely issuing the performance goals of the enterprise, departments and employees at all levels, and analyzing and statistics of the assessment results. The manager of the enterprise will have the highest authority, and will cooperate with the human resources leader to complete the formulation, implementation, evaluation, control and management of the enterprise strategic performance plan.

### 3.2 Overall Design

The enterprise performance management information system will adopt B/S structure, based on JavaWeb, and use Struts2 framework to complete the overall design and development of the system according to the MVC model. The Struts2 framework divides the JavaWeb system into view layer, model layer and controller according to different responsibilities. As shown in Fig. 5, the view layer referred to by View in the figure is the functional interface for the user to complete the human-computer interaction operation of the system, including four functions: performance planning and setting, process supervision and review, performance evaluation implementation, and performance summary analysis modules to support the use of users with different roles in the system. The controller will be served by FilterDispatcher under the Struts2 framework. The model layer Model represents the business logic of the application, which is realized by the JavaBean container. The emission mechanism is used to realize the conversion between the Model and the JavaBean, so as to realize the retrieval and application of the data in the database. Finally, the system can perform operations such as Select (query), Insert (insert), Update (update), and Delete (delete) on the data table as long as the data access layer DAL is called, without being coupled with the specific ORM layer implementation. Access to the database [5].

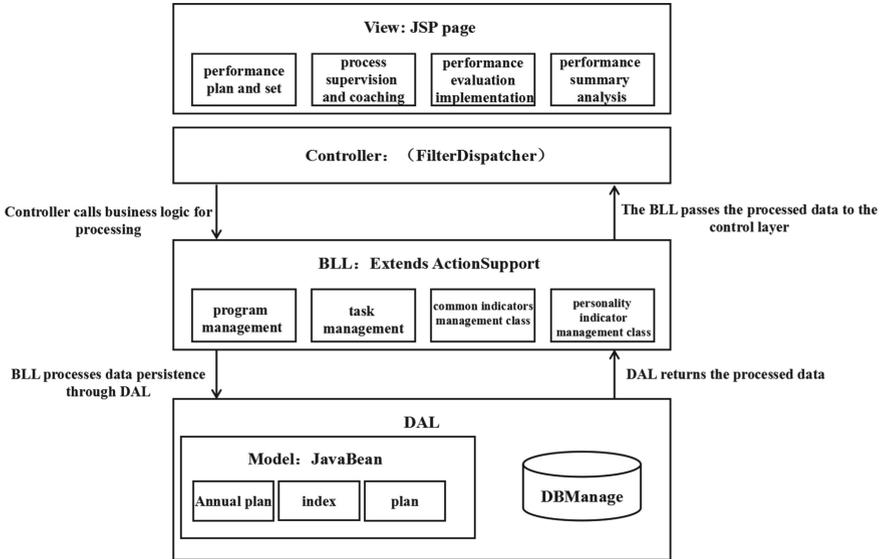


Fig. 5. Overall architecture diagram of enterprise performance management system (Original)

## 4 Detailed Function Implementation

### 4.1 Performance Planning and Setting

Enterprise performance management is a cyclic process, and enterprise performance planning and setting are the beginning of the whole cycle [3]. The setting of the enterprise performance plan involves all the users of the system, and the performance plans formulated by users at different levels are different, but generally present a pyramid shape. This system adopts the KPI performance management system, and the key indicator system is divided into three layers according to the level of the enterprise’s organizational structure, namely the strategic layer, the business layer, and the basic layer, which correspond to enterprise managers, leaders of various departments of the enterprise, and ordinary employees.

In the strategic layer, the company managers and the leaders of the human resources management department will have the authority to log in to the system to set the company’s annual performance plan, that is, the formulation of common indicators. When business-level users log in to this function, the acquired performance plan content is decomposed from the strategic-level plan. After further analysis and research, the departmental performance plan is further improved and sent to the basic layer. Finally, ordinary employees will break down the departmental performance plan again, and based on this, develop a personal performance plan. After users at all levels set the corresponding performance plan, the system will automatically save it as the basis for subsequent assessment. Under this function module, the system also supports high-level users to view and review the performance plans of low-level users, so as to ensure the scientific and rationality of the formulation of performance plans.

## 4.2 Process Monitoring and Auditing

Process supervision and review is the execution stage of performance management. The system will formulate performance appraisal indicators according to the performance plans of different levels and employees combined with the enterprise performance appraisal plan, and determine the weights of different indicators in performance appraisal according to the KPI method. When the human resources department formulates the assessment standards, it will also formulate multiple assessment standards according to the specific conditions of different departments, and ensure the feasibility and quantification of the assessment indicators to facilitate the statistics of subsequent assessment results.

All levels and users can fill in the indicators under this function module, and the system will save them in time. The system function still supports the viewing and auditing function of high-level users on the performance indicators of low-level users, that is, the contents of the indicators to be filled include: cycle, description of completion status, actual completion status, attachments, and completion status of lower-level users, etc. After filling in the report, it can be submitted Audit, in order to realize the supervision and control of the enterprise performance management process [10].

## 4.3 Implementation of Performance Appraisal

Under this function, the human resources management department will complete the performance evaluation according to the process, and obtain the corresponding evaluation results. First, the assessment indicators submitted by all employees will be obtained and the corresponding indicator scores will be calculated according to the weights. And then the performance plan will be called to obtain the overall indicators that all employees are responsible for, and the overall indicator scores will be calculated according to the weights. Combine the actual index score with the overall index score to form a triplet, that is, the performance score  $P = (\text{index score } P_i, \text{ overall index score } P_j, \text{ time } T)$ . The calculation formula is shown in Eq. 1.

$$P = \sum_{i=1, j=1}^n \frac{P_i}{P_j T} \quad (1)$$

The above is the whole process of enterprise performance evaluation in the time period  $T$ . In addition, the department's evaluation process and the final score aggregation process are similar to the sub-process.

## 4.4 Performance Summary Analysis

Under the sub-function module, all employees can timely inquire and know their own performance evaluation scores and the completion of performance plans, and department leaders can also obtain the performance evaluation results of their own departments. For the human resources department and business leaders, further analysis and totaling of the enterprise performance evaluation results will be carried out. Field query and retrieval can obtain different analysis and summary results to strengthen the control and tracking of enterprise performance plans.

## 5 Conclusions

The construction of enterprise performance management information system can solve the problems of the current lack of enterprise performance management, imperfect enterprise performance management system and only emphasis on form rather than substance by means of the advantages of network information technology. In the mode of network application, the overall planning and process reorganization of enterprise performance management are realized. Guided by performance management methods, the process management and result assessment are combined to build a comprehensive enterprise performance management system and realize the upgrading and reform of enterprise performance management. Effectively improve the quality and level of refined management within the enterprise, and also provide practical and theoretical basis for the development of the enterprise to be more stable, sustainable and healthy.

**Acknowledgements.** Fund Support: Key R&D Program of Shandong Province (Soft Science Project) “Research on the Mechanism of Entrepreneur’s Social Capital on the Technological Innovation Performance of Technological SMEs in Shandong Province under the New Development Pattern” (2021RKY03041).

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