Application of Workflow Engine in Enterprise Open Technology Innovation Project Management

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Abstract. In order to improve the execution efficiency and benefits of enterprise technology innovation project management, this paper proposes that an open project management platform should be established, including information portal, technology project management platform, external resource docking channels and technology innovation knowledge base. In the enterprise technology innovation project management using the business driven and process control mode, workflow affinity should be used to effectively improve the efficiency of the management system.

Keywords: workflow engine; technological innovation project management

1 Introduction

For a country or a nation, technological innovation is an inexhaustible force for development and progress; For enterprises, it is a necessary condition for seeking a way out and development. Enterprises are the main body of technological innovation and an important new force to promote scientific and technological creation. Technology innovation led by enterprises is also an important way to enhance the core competitiveness of enterprises and improve the economic scale and efficiency of enterprises.

Technological innovation is a systematic and complex project, and the project is its important carrier, while project management is the core content of technological innovation management [1]. How to create a benign innovation environment and an effective incentive mechanism for the main body of technological innovation, and improve the implementation efficiency and benefits of innovation projects, has become an important issue of concern to all sectors. At the national level, guiding documents and management measures have been issued successively, and relevant scholars have also put forward reform plans such as project management responsibility system, innovative project cooperation mode, scientific research project risk management, etc.

Analyzing the current situation of technology innovation project management in China's enterprises from the perspective of management, it still remains in an isolated and isolated traditional mode, which can neither ensure the organic connection between project management at the horizontal level, nor guarantee the close integration with the company's strategy. Some enterprises have introduced a systematic management idea, which is just a decentralized management of a single project. They have not managed

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all the projects of the enterprise as a whole. This is not conducive to the optimization of the company's overall resources, nor can they efficiently deal with important activities directly related to the existing business or closely related to the future development goals of the enterprise.

At present, modern information technology is widely used in project management, and modern information technologies such as computer, Internet and communication are used to collect, store and process project information, so as to provide accurate and effective information for decision-making [2]. With the development of modern information technology and its wide application in project management, the informatization research of technology innovation project management has become a hot spot in the field of project management research.

2 Enterprise open technology innovation project management platform

The complexity of a technological innovation project determines that the completion of a specific project requires the joint coordination of many management departments, and many unknown factors are hidden in the specific implementation process of the project. Therefore, to finally complete the project, it is necessary to integrate personnel from different organizations with different experiences.

Modern project management discusses the general management theories and methods of various projects in modern social activities. At present, the development of scientific and technological innovation concept in China is relatively short. Many enterprises do not realize the importance of technological innovation management in enterprises. Even some enterprises want to carry out technological innovation, they lack effective management methods. Relevant personnel do not manage the quality, progress and cost of the project implementation, The failure to establish an efficient project tracking and management mechanism has led to such undesirable phenomena as project delay and cost exceeding budget, which has reduced the speed and efficiency of technological innovation, thus restricting the development of enterprises and social economy to a certain extent [3].

Only by studying the basic principles of project management, enterprises increase the input of human, material and financial resources, and effectively combine technological innovation with project management methods, can they provide a favorable guarantee for technological innovation management of enterprises. The enterprise open technology innovation project management platform draws on the advanced project management theories and methods at home and abroad to establish a systematic, standardized and institutionalized technology innovation project management system, laying a solid foundation for modern management and information application of enterprise technology innovation projects.

2.1 Technology innovation information portal

As the information release platform of science and technology innovation projects, the technology innovation information portal releases project demands and project progress internally and externally. Internal personnel can initiate project application requests on the website, and external personnel and organizations can register to participate in the project, becoming a channel for integrating internal and external project cooperation. At the same time, the portal website can also publicize the enterprise's scientific and technological innovation policies and regulations, display the construction achievements of high-quality projects, and is a publicity platform for enterprise technological innovation projects.

2.2 Technology innovation project management platform

Online the internal technological innovation project management process of the enterprise; Carry out life-cycle management of projects from release, declaration, review, project approval, contract signing, fund allocation, project implementation, mid-term inspection, final acceptance, intellectual property declaration, project exhibition, etc; Manage the personnel, organization, funds, progress, quality and documents involved in the above links in an all-round way; Establish project archives, track the project implementation process, and realize paperless and standardized project management process.

2.3 External technology innovation resources docking channel

It provides an open access through the portal, connects with domestic and surgical research institutions, technology innovation service platforms, and technology innovation community platforms, and establishes project collaboration with external universities and research institutions. Through the interface, it releases needs, recruits talents, and integrates external resources to form an open research innovation model.

2.4 Technological innovation knowledge base

Based on the standardized management of technological innovation projects and the introduction of external resources, technological innovation knowledge is formed. The knowledge base includes: technological innovation project information base, technological innovation policy information base, document database, intellectual property database, expert database and cooperative organization database.

3 Workflow based technology innovation project management technology

Enterprise technology innovation project management involves many business processes from project design to development, application, evaluation, project approval,

contract signing, fund allocation, specific implementation, mid-term inspection, final acceptance, patent application, etc. Each business process may need to cross reference the previous data, and different business processes will involve many participants. At the same time, it needs to consider that it will become an open system for enterprises External institutions or organizations provide relevant functional services [4]. In enterprise project management, most of the work in the business phase belongs to process work, such as project approval, acceptance approval, etc. The application is initiated by the grass-roots business personnel, accepted by the department head, reviewed and submitted to the superior, and finally returned to the grass-roots department after being reviewed and approved by the final responsible person of a certain level.

Therefore, the use of business driven and process management and control mode to improve the efficiency of technology innovation project management system can be well achieved by using workflow technology. The concept of workflow engine is actually a software system, a computer execution environment defined by workflow, a core component of workflow engine system, and belongs to the category of middleware. As shown in Figure 1, the workflow reference model identifies the basic modules that constitute the workflow engine and the interfaces that these basic modules interact with. These basic modules include: workflow execution service, workflow engine, process definition tool, client application, call application, management monitoring tool.

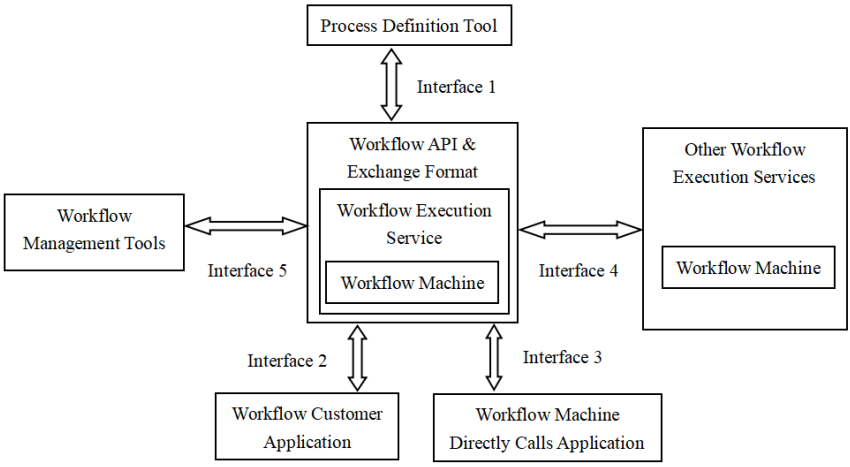

Fig. 1. Workflow Engine Reference Model (Original)

The workflow engine processes the process definition data, which drives the automation of a business process according to the process flow rules defined by the process. As shown in Figure 2, the basic model of workflow engine processing a business process is described.

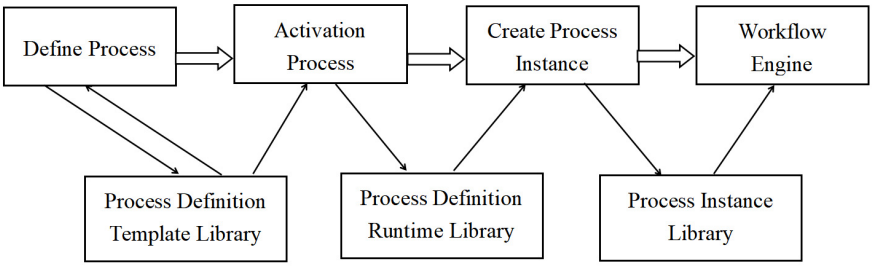

Fig. 2. Workflow Engine Processing Model (Original)

Workflow engine is generally divided into three stages in practical application: workflow modeling stage, workflow model instantiation stage and workflow execution stage.

In the workflow modeling stage, the business process model is established through workflow modeling tools, and the actual business operation process is transformed into a workflow model that can be simulated and processed by the computer; In the workflow model instantiation stage, the workflow engine is mainly used to complete the instantiation of specific business processes, provide workflow related data and workflow control data for the handling of specific business processes, and provide the required resources for the handling of business processes; The workflow execution stage mainly completes the execution of business processes, focusing on completing human-computer interaction and calling of internal or external applications of the system.

The project management based on workflow technology separates the process generation, flow logic, execution, monitoring, management and other work implementation codes from the specific business, forming a special "workflow engine". When designing business processes, designers only need to pay attention to the business logic of the business process itself, and then call the workflow engine to realize the specific business flow after completing the business logic design. When the organization, personnel role or business process of the project company changes, you only need to modify the business logic and bind the workflow engine to complete the maintenance of the business process, greatly reducing the maintenance difficulty and maintenance cycle.

Take the K2 workflow engine as an example, as shown in Figure 3, which shows the K2 workflow platform, the extended process management and initiating site (Administrator Web Site), the workflow subsystem, and the logical relationship with IAP. Among them, Administrator Web Site provides workflow business system with functions such as process initiation and process management. K2 provides the Administrator Web Site with process flow services, process management and control, and process monitoring. IAP is a single sign on and directory synchronization service for K2, Administrator Web Site, workflow business system.

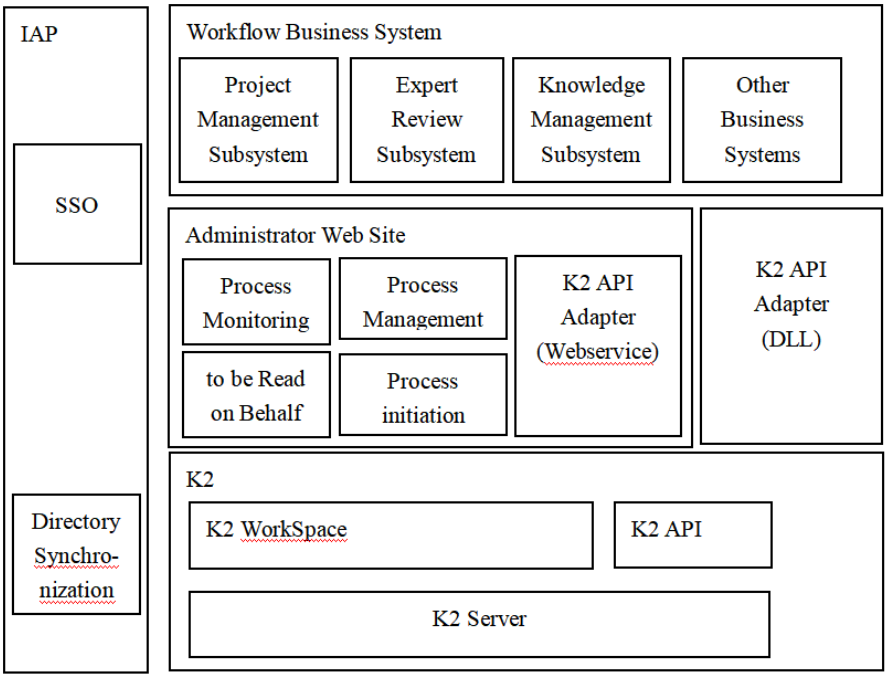

Fig. 3. K2 Workflow Platform Architecture (Original)

The implementation and tracking of each link of the enterprise open technology innovation project driven by workflow plays a complete supporting role in the informatization project. Through the formation of complete project documents and tracking and management of key business processes, many years of information project management experience will be precipitated and improved to achieve electronic management of project management workflow and improve work efficiency; Through transparent project monitoring and performance appraisal, realize the management of informatization construction effect; The project business data shall be formed and summarized to assist the leadership in analysis and decision-making.

4 Conclusions

The establishment of an enterprise's open technology innovation project management platform can realize the informatization of the enterprise's internal technology innovation project management process. Information can be collected, stored, processed and processed by making full use of computer, network, database and other information technologies to improve the management level, reduce management costs and improve management efficiency [5]. Complete the transmission and exchange of information and data externally, improve the degree of information sharing internally, speed up the

transmission of information, improve the internal collaborative work ability of enterprises and projects, and improve work efficiency.

The benefits of enterprise technology innovation project management based on workflow support are very significant, which can fully mobilize the enthusiasm and creativity of enterprises and R&D personnel, and promote the standardization, scientization and institutionalization of project management. While ensuring the quality of technological innovation project results, it will also accelerate the process of the project and save the cost of project development.

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