


Research Article

Process-Aware Accounting Information System Based on Business Process Management

Feifeng Li ^{1,2} and Gang Fang²

¹School of Economics and Management, Huainan Union University, Huainan 232038, China

²School of Information Engineering, Huainan Union University, Huainan 232038, China

Correspondence should be addressed to Feifeng Li; lifeifeng@hnuu.edu.cn

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In order to improve based on financial shared services, enterprises can better promote the establishment, deepening, and optimal development of their own management accounting informatization. This paper introduces BPM system, analyzes the process perception accounting information system of business process management, and verifies that process perception can promote the research of accounting information system with the help of case analysis. Based on the problems, optimization scheme, and optimization effect of JKJT accounting informatization in a city, this paper makes a practical analysis and case analysis method. It is proposed that the four optimization effects of JKJT accounting informatization can be obtained by improving the authenticity and accuracy of subsystem business data, standardizing the division of personnel post rights and responsibilities, strictly implementing the system, changing the cost accounting method, and strengthening the training of management innovative accounting informatization talents and other optimization measures. Its main financial indicators show that the operating cost of JKJT in City A in 2019 was RMB 90.0309 million, a decrease of RMB 8.1781 million over 2020, a year-on-year decrease of 8.33%, mainly due to the establishment of financial sharing mode in 2019 and the strengthening of cost management and control of funds of branches by the finance department. At the same time, the acceptance measurement of the local project in City A is 57.0251 million yuan, because the project is operated locally, the financial service advantage is obvious, and the cost is relatively low. At the same time, by summarizing the application process of information management system, the in-depth analysis of information management system is realized. Information management system has strong efficiency in economic promotion. We should actively promote the application of the system to promote the improvement of economic construction level.

1. Introduction

With the rapid development of economic globalization and informatization, enterprises are facing severe challenges and new development opportunities. The competitive environment of modern enterprises has undergone great changes [1]. Customer demand is diversified and personalized, the seller's market is transformed into the buyer's market, the pace of technological innovation is accelerated, the product life cycle is shortened, and the market dynamics are changeable. Customers, competition, and change are great

challenges from the outside to the enterprise, while the organizational structure is the biggest challenge from the inside of the enterprise [2]. The traditional management mode is centered on functional management. This mode is easy to cause too many levels, overstaffed institutions, unclear responsibilities, and other phenomena, so that enterprises cannot respond quickly to the requirements of the market and customers and then slowly lose their initiative in the rapidly changing market. Moreover, the division of internal functional departments makes the business process of enterprises in a state of segmentation and fracture. These factors make the management

efficiency of enterprises low and the operation cost increase. In order to adapt to the rapidly changing and highly competitive market and enhance the ability of survival and development in this environment, enterprises need to change the management mode incompatible with the current business environment as soon as possible and establish an organizational structure and management mechanism that is convenient for external environmental changes and flexible response [3]. The summary of enterprise business volume is shown in Figures 1 and 2. It can be seen from Figure 1 that the current internal business volume of the enterprise is increasing year by year from 2018 to 2020.

With the changes of social and economic environment and the growth of the ability of information technology support system, a new type of process management has emerged. This process management system is called “the third wave of process management” by researchers, and relevant research is being promoted in an all-round way. The new generation of process management takes the process as the center. By optimizing the enterprise organizational structure, process design, and customer-oriented horizontal process management system, improve the operation efficiency of the enterprise, optimize the utilization of resources and the cooperative relationship between personnel, reduce the operating cost of the enterprise, improve the response speed to customer needs, and realize the enterprise profit maximization. This business process management system has the characteristics of reusability, flexibility, and agility and has the ability of crossenterprise and technology platform to ensure the fluency and automation of business processes [4]. However, in the past information process, there are great differences in various application systems of enterprises, forming heterogeneous application systems with different middle layers. Their interoperability and connection have become the main obstacle to high-level process integration management, and even there are problems of heterogeneous system integration within enterprises. With the deepening of the concept of business process reengineering (BPR) and the increasing maturity of the application of information technology, “process thought” and “process redesign” have gradually become the mainstream ideas of enterprise management in the 21st century. Accordingly, the traditional idea of building information system with function as the core has gradually shifted to “process management” and “process control,” resulting in the idea of process-aware information system. In Marlon Dumas’s classic textbook of information system *Process-Aware Information System*, the definition of process-aware information system (PAIs) is given: “a software system based on process model for managing and executing process, in which the process involves people, applications and information resources.” From the perspective of application, process-aware information system supports the concept of business process reengineering. From the implementation level, it follows the model-driven architecture technology [5]. From the perspective of users, it adopts the operation mode like office automation system and runs through the whole process of system operation with the main line of business process. The purpose of this paper is to explore the reengineering

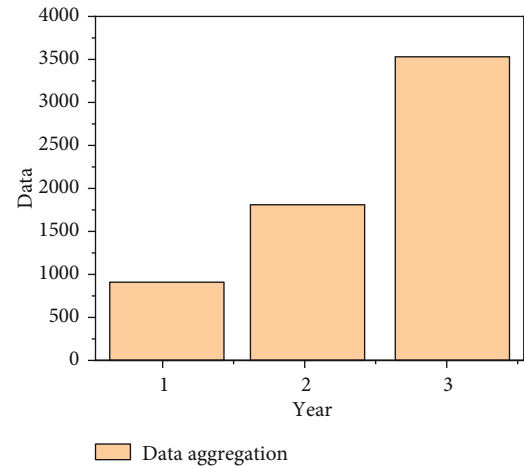


FIGURE 1: Summary data of enterprise business volume.

of accounting information system with the help of the idea of process perception. This paper focuses on the process involved in enterprise real management. In management theory, enterprise process refers to the activity process of organizational structure and personnel using management information, technology, and methods to achieve enterprise objectives. A process can also be defined as an ordered collection of a series of logically related activities to complete a certain goal or task. The main body of the process is composed of activities, and there are not only strict sequence restrictions between activities. Moreover, the contents, methods, and responsibilities of activities must also be clearly arranged and defined, to make it possible for different activities to change hands between different post roles [6].

2. Literature Review

In view of this research problem, Zhang and others believe that financial shared services are customer-oriented, and the internal departments of the company specify corresponding solutions according to the specific needs of customers to provide such specialized services [7]. Aurachman and others believe that shared service is to complete repeated and routine work in the enterprise by specifying the internal organization of an enterprise and adopt certain standards and processes to turn it into self-service of the enterprise and to improve efficiency, create value, save cost, and achieve business success [8]. Zhang and others divide the service content of financial sharing into four categories: the first category, such as cash entry, sales order, and other inflow management; the second category, such as outflow management of material procurement and receipt notice; the third category, such as internal control, budget management, and other comprehensive control; and the fourth category is to provide knowledge intensive remote consulting services. The core business personnel can focus more on finance [9]. Xu and others summarized seven characteristics of financial sharing according to the practice of enterprises on financial sharing services: standardization, process,

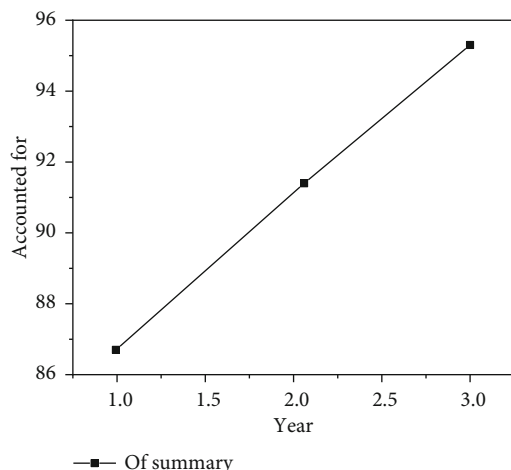


FIGURE 2: Summary proportion of enterprise business volume.

institutionalization, high quality, high efficiency, low cost, and value creation [10]. Zhu and others pointed out that the shared service center can be a targeted shared service organization or enterprise provided outside the enterprise. It is an innovation of the operation and management mode with the customer's requirements as its own development direction. It can provide shared services for enterprises in different functional departments and industries through price and service level [11]. Kostikova and others pointed out through research that after ZTE establishes sharing center, enterprises and financial personnel can have a good space for learning and development and will get good results and development prospects [12]. Wang and others analyzed the stage characteristics and existing problems of bank information construction focusing on comprehensive business system and discussed the functional framework and planning mode of bank information system construction with management accounting as the core [13]. Zhang and others studied from the perspective of credit management informatization and believed that the development of bank informatization can be divided into "three stages," traditional business and computer application stage, computer network and business innovation stage, and data application stage [14]. Yu and Sun believe that state-owned banks have entered the "flat" development stage [15]. He and others believe that the information construction of large and medium-sized banks has completed the initial installation, popularization, and control stage of Nolan model. At present, it is in the late stage of integration or the middle stage of data management, while most small and medium-sized banks are in the control stage of information system [16].

3. Methods

According to the prediction of an international consulting company, a new generation of BPM technology will appear within ten years, and it is also believed that this technology can determine the enterprise management within 50 years

in the future. At present, the research work of this technology mainly focuses on the system, model, and definition language, as well as the evaluation content of implementation technology and policy. We can directly grasp the transaction characteristics of the process and realize the operation in different fields in this system in combination with the application of various Internet technologies. When studying this work, we can solve various scheduling tasks such as theory construction, model verification, simulation, and resource coordination, to deal with the problems in the process and to form a system integration scheme. At present, there are no standard requirements in this work, so this research work can be carried out from many aspects. If the key problems are analyzed from a strategic perspective, this model can be studied in combination with ARIS framework and analyzed in combination with corresponding theories [17]. If the analysis is carried out according to agent technology, we need to start with the distribution of heterogeneous environment and process cooperation mechanism. However, if we study it in combination with BPM implementation method, we need to improve the evaluation, so that we can analyze it in combination with the process model. BPML is a description language based on language model. It can summarize data flow, event flow, and information flow in combination with the actual needs of business processes. At the same time, on this basis, it can also help business processes add corresponding rules and systems, to improve the quality and level of management. Compared with traditional methods, this kind of method has strong advantages. For example, it can directly describe the end-to-end process, or it can directly analyze the process model from the perspective of participants. This kind of process form ensures the requirements of consistency check and process optimization capability. When connecting to the access port, it is necessary to check the operation status in combination with the process instance, and the subsequent process model can also be deployed [18]. With the continuous development of current products and services, more and more enterprises choose to start applying BPM system. At first, large companies use this system, followed by small and medium-sized enterprises, followed by smaller enterprises. Therefore, it is not difficult to see that this system is more attractive to market transformation and allows more heavyweight enterprises to apply this system [19]. After purchasing the system, you can select the appropriate server suite in combination with your own business direction to help open the service function. The enterprise only needs to purchase this system once, and it can be developed and integrated in the future. At present, Microsoft has built a business process alliance, and alliance members agree to add support for Microsoft business process management server to their business process management products. The establishment of the new alliance shows that business process management has reached an inflection point in its own development process, which has attracted the attention of more and more middle-end market companies. The market is ready to adopt business process management solutions on a large scale. The alliance will focus on the development of business process modeling and analysis, business rule management, people-oriented

process flow, process simulation, and service-oriented architecture life cycle management. If the enterprise architecture is integrated with the service-oriented architecture, it can provide a blueprint for the development of the enterprise architecture [20]. SOA is a coarse-grained, loosely coupled service architecture. Services communicate through simple and accurately defined interfaces, which does not involve the underlying programming interface and communication model. In the system of SOA architecture, the function of specific application is constructed by some loosely coupled components with unified interface definition, that is, service composition. Because BPM system needs to deal with the process integration between people, people and systems, systems and systems, and the combination of BPM system and SOA can release the burden of integration but concentrate on the interaction and integration between systems. Software vendors say the big advantage is that they can extract back-end applications from the process, while BPM tools allow business people to specify how the process will be executed and what services to adopt without having to have an in-depth understanding of technology. The integration process of BPM construction, industry, and finance is shown in Figure 3. The architecture of BPM system is shown in Figure 4.

According to analysts' prediction, BPM will become the driver of SOA implementation, and the integration technology integrating BPM and SOA is still immature. The alliance between BPM and SOA will increase their chances of becoming leaders in the industry. Enterprises should start to try the tools and practices to achieve SOA-BPM Alliance based on existing technology, so as to occupy a leading position ten years after the maturity of this technology. The SOA-BPM alliance architecture is shown in Figure 5.

The business process management system separates the process from various underlying applications, which can realize process design, storage, query, and deployment and form data redundancy and consistency dislocation with other systems through the process server, which is difficult to realize collaboration and sharing. This paper puts forward the design idea of business process management system based on ontology. Heterogeneous systems interoperate with ontology to realize the sharing and reuse of business processes. This paper mainly carries out the following research work:

- (1) On the basis of business process analysis and modeling, the description of business process conceptual model based on ontology is realized, which provides support for the construction of process knowledge base and process retrieval
- (2) According to the idea of case-based reasoning, an ontology-based business process knowledge base is established, and the business process is decomposed based on goal. The business process model is stored in the process knowledge base in the form of file storage, so that the business process can act as a medium for semantic recognition of concepts in the field of business process management in different

application systems, to avoid repeated design of the process and realize sharing and reuse

- (3) Taking the procurement business process as an example, an ontology-based business process management system is realized. The experimental system involves the functions of ontology-based business process description, analysis, storage, retrieval, and reasoning

3.1. Solutions to Research Problems

3.1.1. Business Process Management Overview. Business process management system provides a software environment for realizing the function of BPM. BPMS describes the business process model with a unified representation, which makes the business process extracted from the implementation logic and used by various enterprise applications. The business process management system is the same as the database management system, which manages data from all angles. It can realize process design, editing, storage, and query. Therefore, it cannot be limited by department boundaries and business types, makes full use of enterprise application systems, realizes cooperation among enterprises, manages processes independently, and makes the formulation of specific processes possible, which has great flexibility.

3.1.2. BPM Definition. The business process of an enterprise is the process in which an enterprise completes its business and obtains profits. Production process, financial process, new product development process, procurement process, and supply process are all a manifestation of enterprise process. In the traditional management mode centered on functional management, enterprise process only connects multiple functional elements of the enterprise in a structured and sequential way. When dealing with the relationship between processes, set the necessary materials to strengthen the mutual independence of processes rather than the integration of processes. This process can only be regarded as a production process rather than a business process. At present, there are many definitions of process. Process is defined as an overall system composed of many business activities. It is composed of four elements: activities, logical relationship between activities, implementation mode of activities, and bearers of activities. Another creator of business process reengineering theory defines process as the sum of a series of organized and measurable activities that produce specific products or services for specific customers or markets. It focuses on how the work in the organization is completed, not how the product is produced. The above are the various definitions of interpretation and management masters in the dictionary.

Business process management is a process that uses resources and information to convert input into output under certain constraints to achieve a series of business activities with certain logical relationship. In the traditional principle of division of labor, the function-oriented management mode decomposes each process into segments. People pay attention to a single task or work within the department. Each doing its own thing is bound to cause various internal

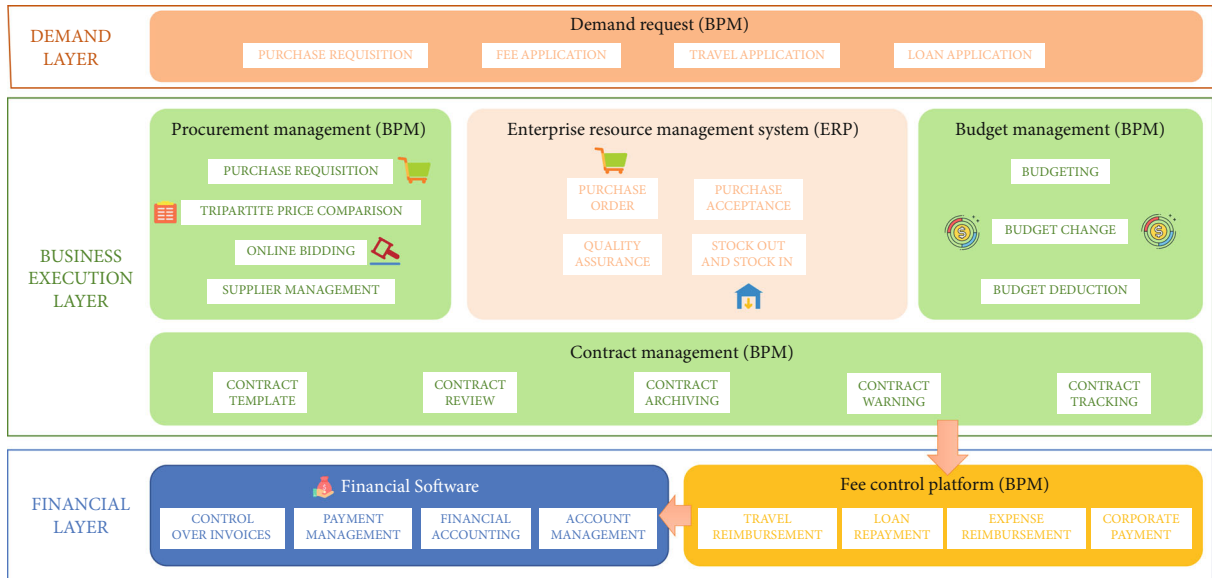


FIGURE 3: BPM construction industry finance integration process.

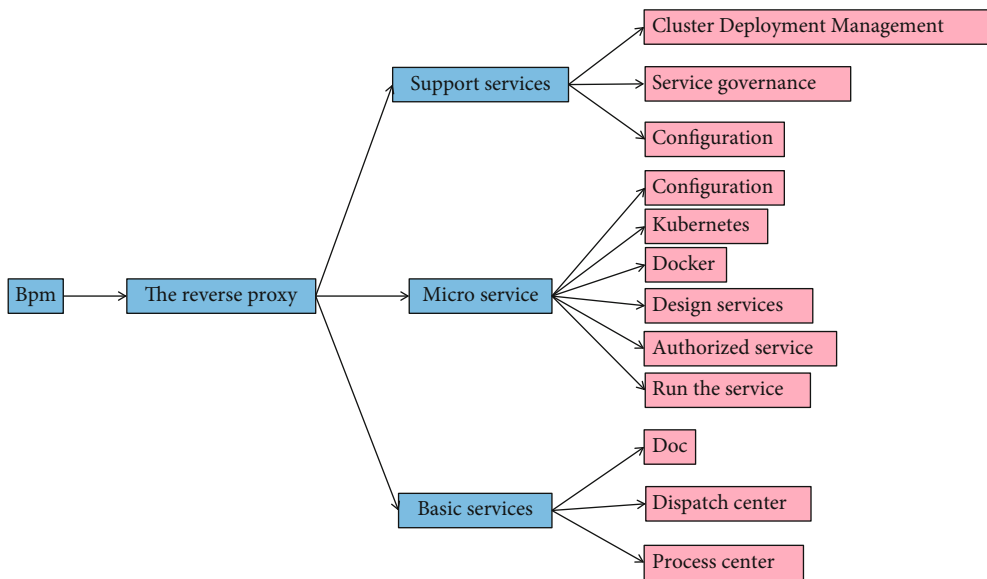


FIGURE 4: BPM system architecture.

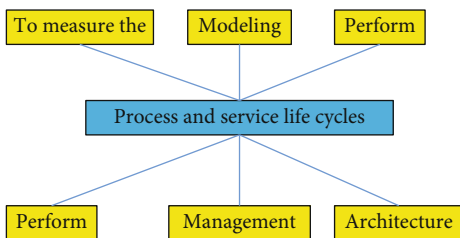


FIGURE 5: SOA-BPM alliance architecture.

contradictions, which is not conducive to the realization of the organizational goal of the enterprise. In the environment of fierce market competition, the obstacles caused by this model to the development of enterprises are becoming more and more obvious. BPM is a process-oriented management mode. According to the business process and long-term development plan of the enterprise, combined with the current situation of the enterprise, it designs the improvement scheme of the business process, combs and optimizes the business process of the enterprise, finds out the missing process, and standardizes the nonstandard process. Finally, put forward reasonable business processes and determine the

strategic objectives of the enterprise, to improve the efficiency and management level of the enterprise; make great progress in key indicators such as profit level, production efficiency, product development ability and speed, and customer satisfaction; and finally improve the overall competitiveness of the enterprise [21].

3.1.3. BPMS Function Module. The ideal business process management system should have the following functional modules:

Process warehouse: provide a centralized storage place for processes and process-related knowledge, and provide directory services to facilitate process query and release.

Process design: design the modules, logic, rules, and execution roles of the process, and provide process templates and reuse mechanisms.

Process configuration: bind participants, allocate resources, and set other specific parameters for the operation of process instances.

Process engine: drive the operation of the process, maintain the process data, manage the state of the process, and realize the transaction management of the process. For distributed processes, it is necessary to interact and coordinate with other process engines.

Process maintenance: process monitoring and exception handling.

Capture process entry: provide a unified process access mechanism for process users, including work task list and report, and provide process access rules of enterprise alliance.

Process optimization: optimize resource utilization to ensure process consistency and prevent deadlock.

Process analysis: analyze the key performance indicators and process simulation, and analyze the time and resource performance of the process.

3.1.4. BPMS Process Knowledge Base. Business process management system enables enterprises to model, deploy, and manage core processes. Firstly, business analysts are required to model business process analysis and store the basic process design patterns in the process knowledge base, which can be responsible for distributed authorization for business processes based on network users for their access. Secondly, using the process management tools that can be accessed by any browser, users can add and deploy business processes from the process knowledge base to the process management system. Processes can be deployed and updated without interrupting the process server. The tools provided to users can dynamically query the status of any process instance like the process server itself.

3.2. Experimental Method for Verifying the Scheme

3.2.1. Process Perception Judgment Method. In order to truly simulate the decision-making process of managers, based on the theory of perceived value, the link of perceived judgment should be introduced to complete the development of the whole system. The supplementary content of the system is the judgment link, which is reflected in the process model.

It is the first three links, namely, attention, interest, and desire.

Attention: for managers, there are usually the following channels to obtain information: business materials, sales personnel, network, etc. in various channels; some contents will always be mentioned repeatedly to impress themselves. At this time, managers need to analyze the management process in combination with some contents, which will attract attention. At this point, we set the known content to α .

$$\alpha = \frac{\sum_{i=1}^n a_i}{n} \times 100\%, \quad (1)$$

$$\frac{\sum_{i=1}^n a_i}{n} \times 100\% = \frac{a_1}{n} + \frac{a_2}{n} + \frac{a_n}{n} = 100\%, \quad (2)$$

α is the degree of understanding, N represents number of perceived information, and a_i represents the understanding of perceived information.

Interest: after managers have a certain understanding of a certain management work, they can effectively configure it, to change the traditional management scheme and system configuration in combination with the corresponding needs and further understand the opportunities or ideas of the specific situation of the configuration, to analyze the benefits and damages brought by this practice. Managers' clear knowledge of the specific situation of a certain configuration is the precondition for optimizing management. In this paper, managers' understanding of a certain work is called configuration understanding β .

$$\beta = \frac{\sum_{i=1}^n a_i}{n} \times 100\% \quad (3)$$

$$\frac{\sum_{i=1}^n a_i}{n} \times 100\% = \frac{a_1}{n} + \frac{a_2}{n} + \frac{a_n}{n} = 100\% \quad (4)$$

β represents the degree of understanding, N represents the number of perceived information, and a_i represents the understanding of perceived information.

Desire: when and only when managers fully understand the specific content of a certain information can they comprehensively evaluate and measure whether the management work meets the needs in combination with the current and foreseeable future management situation. The higher demand degree can lay the foundation for the follow-up management work, and its predictability of the final management degree is called demand degree (γ).

$$\gamma = \frac{\sum_{i=1}^n a_i}{n} \times 100\%, \quad (5)$$

$$\gamma = \frac{a_1}{n} + \frac{a_2}{n} + \frac{a_n}{n} = 100\%. \quad (6)$$

γ represents the degree of demand, N represents the number of perceived information, and a_i represents the understanding of perceived information.

3.3. Exception Handling Based on Case-Based Reasoning.

The case-based reasoning method writes the historical exception handling situation into a case and saves it in the case base. When an exception occurs, search the case base, match the current exception with the cases in the base, and find the case with the greatest similarity. If the two situations are the same, handle the current exception according to the solution of the case in the library; otherwise, it will be adjusted with reference to the solution of the case in the library to generate the solution of the current exception. After the exception handling is completed, the solution will be stored in the library as a new exception case for subsequent reference.

3.3.1. Exception Handling Based on ECA Rules. ECA rule method describes the exception handling conditions and behaviors with exception event E (event), condition C (condition) for determining the exception and its type, and exception correction or compensation activity a (action). Process P can be defined as a triple set:

$$P = \langle a, c, r \rangle, \quad (7)$$

where

$$A = \{a_1, a_2, \dots, a_m\} \quad (8)$$

is a collection of process activities. Then, each element item in each activity $a_i (1 \leq i \leq m)$ represents the activity executor, the application called by the activity, time constraint, input, and output data in turn.

$$CcA \times A = \{c, c_1, \dots, c_n\} \quad (9)$$

is the connection between activities, indicating the activity control logic. Each connection $c_j (1 \leq j \leq n)$ corresponds to a condition to judge the activation condition of the connection.

$$Rca \times C = \{r_1, r_2, \dots, r_k\}. \quad (10)$$

It is a process logic rule that describes the logical relationship between activity import/export.

Rule-based ECA

$$ECASET = \{ECA1, ECA2, \dots, ECA1\}. \quad (11)$$

Each ECA rule can be defined as a triple:

$$ECAi = (Ev, Co, Ac), \quad 1 \leq i \leq 1. \quad (12)$$

Ev is an abnormal event and a triple:

$$Ev = (\text{type}, \text{time}, \text{locate}), \quad (13)$$

where type is enumerative data, indicating that the type of abnormal event corresponds to different processing methods. It is generally a composite class.

3.3.2. Knowledge-Based Exception Handling. With the development and application of knowledge management technology, knowledge utilization has attracted more and more attention in the business community. In the field of flexible business process management, experts and scholars also actively explore the role of knowledge in exception handling. At present, some scholars have proposed exception handling technologies and methods based on knowledge management theory, among which knowledge exception handling is the most representative. This method classifies the exceptions according to the general process classification structure, establishes the exception type knowledge base, and describes the basic characteristics of each exception type, prediction and detection methods, and prevention and solution methods in the knowledge base. On this basis, using the association between the process model and the general process classification structure, we can find and determine the types of exceptions in the process of implementing business process management and then provide the functions of foreseeing, detecting, preventing, and solving exceptions according to the exception information in the exception type library. Based on daily processing, the basic process is shown in Figure 6.

3.3.3. Parameter Optimization Process of Process and Its Knowledge Requirements. The parameter optimization of the actual process mostly belongs with multiparameter and multiobjective optimization. Generally, the optimal algorithm is adopted. By establishing the optimization model, the indexes such as process time, cost, and resource utilization are comprehensively considered. After determining the optimization objective function, decision variables, and constraints, the optimization approximation iterative algorithm is used to gradually adjust the process parameters until the requirements are met.

If the process model $\min f(x)$ is to be solved, where x is an n -dimensional vector,

$$X = (x_1, x_2, \dots, x_n)^t \in R^n, \quad (14)$$

Variables x_1, x_2, x_n refer to the process decision variables to be solved and $f(x), h_1(x), g_j(x)$ represent the objective function, constraint function, and condition, respectively.

$$h_1(x) = 0, \quad i = 1, 2, m, \quad (15)$$

$$G_j(x) \geq 0, \quad j = 1, 2, p. \quad (16)$$

The feasible region formed by the set of all feasible solutions x is recorded as D . The optimization approximation iteration process for solving the model is as follows.

Determine an initial feasible point $X \in D$; let $k = 0$.

Starting from the initial feasible point, find a feasible descent direction p_k at point x_k in the feasible region, so that when moving along direction p_k , the function value gradually decreases.

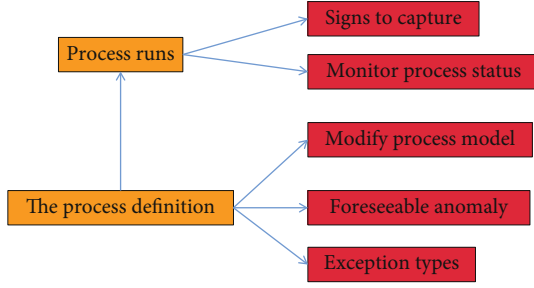


FIGURE 6: Daily exception handling process.

Take x_k as the starting point, and make a ray along the p_k direction

$$x_k + p_k, \quad \alpha > 0. \quad (17)$$

On this ray, press $x_k + \alpha_k p_k$ to find point x_{k+1} so that $f(x_{k+1}) < f(x_k)$, where α_k is the step size.

3.3.4. Similarity and Correlation. In order to compare the correlation and similarity between concepts, the concepts of correlation and similarity are proposed. Correlation is a real number between $[0,1]$. If there is a connected path between two concepts in a certain conceptual system, then, these two concepts are related, and their correlation can be calculated. Similarly, similarity can also be a real number with a value between $[0,1]$. If the semantics implied between the two concepts are the same in a certain conceptual system, the two concepts are similar. There are many methods to calculate the semantic similarity between concepts, for example, the method based on volume label, the method based on corpus statistics, the method based on synonym dictionary, and the method based on graph structure. This paper uses the calculation method of semantic similarity proposed in the literature.

Let t_1 and t_2 be two concepts in the ontology, and d represent the similarity between the two terms; then, there is a formula:

$$\text{Sim}(t_1, t_2) = \sum_{i=1}^n \vartheta_{1(t_1, t_2)} \theta_i, \quad (18)$$

where n is the term; t_1 and t_2 are the maximum depth in the conceptual model; and θ_i is the weight. The weight can be adjusted according to the actual needs.

4. Results and Analysis

The workflow dashboard is mainly used to provide the monitor with the real-time operation of the process. Through the relevant process instance data and information, the system administrator and online operators at all levels can find out the problems and bottlenecks in the process operation and endow the system with stronger process operability and early warning ability. The main monitoring objects of workflow dashboard are process instances and activity instances. The main test objects are shown in Tables 1 and 2 below.

4.1. Analysis of Business System Data Authenticity and Accuracy and Optimization Effect

4.1.1. Real Optimization Analysis of Sales System Data. The optimization of accounting informatization under JKJT financial sharing in a city realizes the real and effective data reading and query of sales subsystem data. From the serious treatment of information input by subsidiaries and sales departments and the convenient operation of Kingdee system, realize the timely and accurate input of sales system data and realize the statistics and analysis of enterprise operation data by sales personnel, financial personnel, and management performance assessors.

The optimization of data accuracy and authenticity of the sales system save the review and inspection work of financial personnel, the workload of financial personnel, labor cost, and operation cost. Sales system data deals with core business in enterprise informatization. Management and decision-making can directly understand the performance and basic cost analysis of core business through system data, to make effective sales performance and sales input-output profit analysis.

4.1.2. Manufacturing Execution Optimization Analysis. The optimization of accounting informatization under the financial sharing of JKJT in City A realizes the query of production execution. The instruction list is generated from different states, and other departments can see the production execution. Before the implementation of optimization, the specific implementation of production can only be mastered and controlled by the manager of the production department and the supervisor of the production workshop. The issuance of production instructions also depends on paper documents to the production workshop. However, now that sales, planning, and production are completed in one line, the financial department and other decision-making departments can query the production implementation and judge whether the materials have been received, whether they have entered the workshop for production, whether semifinished products have been warehoused, and how long the finished products will be completed. Production execution analysis is a high-value core business process in accounting informatization. The management obtains the construction effect of Financial Sharing Center through production execution analysis. The analysis of production execution in accounting informatization can enable the management to regulate the upstream and downstream business departments in real time, reasonably arrange the production plan and schedule, enhance the linkage between production business and financial system, effectively improve the management level of production departments, promote the financial department to collect and process the enterprise production status information, and prepare all aspects of data for decision-making.

4.1.3. Production Schedule Optimization Control. Production progress control is a part of production planning and scheduling. The shortage of a production order can be seen briefly

TABLE 1: Main monitoring test items of workflow dashboard process example.

Monitoring test items	Significance
State	The current state of the process instance in the engine
Start time	Start date and time of the process
Elapsed time	Process instance run time
Running time	Running time of the whole process
Delay	Whether the process overdue
Cost	All costs of starting a process run

TABLE 2: Main monitoring test items of workflow dashboard activities.

Monitoring test items	Significance	Filter type
Transfer	Reassign work item performer	Boolean
Activity name	Activity instance name ID	Text
State	Readr instance has been created; runninr instance started; collete instance has been executed; teinated instance was aborted	Text
User	When the status is running, completed, and terminated, it indicates the executor who currently owns the instance	Text
Creation time	When it is ready, it refers to all personnel who can execute the instance	Date
Start time	Timestamp when the activity instance was created	Date
Completion time	Start time of the activity instance	Date

through the information system, and the adjustment and control of production progress can also be adjusted directly through the system. Through the optimization of accounting informatization, finance is directly linked to production data, and all related data can be found by using one system, which is the linkage of information and the efficiency of management. Before the optimization of accounting informatization in JKJT of City A, the production department was the core value chain of the enterprise, independent of financial informatization, and was fully managed by a deputy general manager. Not to mention the defects of the enterprise system, but from the perspective of enterprise financial management, there is no business department with information output and closed operation information. How to provide enterprises with decision-making, make correct judgment, and create economic benefits. The optimization of accounting informatization has opened the information door of the production department. From the perspective of information sharing, the core value department can send important information through the accounting informatization software. Combined with the initiative of financial management, it can improve the information sharing of JKJT production department in a city and supervise and control the production progress of the enterprise.

4.2. Post and Enterprise Personnel Structure Optimization Analysis

4.2.1. Optimization of Post Structure of System Operators. Under the sharing economy, information sharing, personnel sharing, and financial sharing services, the first layer of the accounting informatization operation structure of JKJT in

City A is the operators participating in informatization, the rights, responsibilities, and evaluation of posts. Effectively improve employees' understanding of accounting information system and information development, and implement effective post rights and responsibilities system, which plays a standardized management role in the management and operation of enterprises. JKJT company of a city uses the mode of "sharing economy theory" to coordinate the idle and standby human resources of the enterprise to the deepening and optimization of accounting informatization and implements the regular operation post rotation system. Not only let the operators of the corresponding posts be familiar with and master the application of the system, but also let the operators of adjacent posts understand the importance of upstream and downstream connection, improve the level of enterprise accounting informatization, and optimize the positive effect of accounting informatization on the enterprise.

4.2.2. Optimization of Financial Personnel Structure. In the process of gradually developing accounting informatization construction in JKJT of City A, the members of the informatization team are constantly updated. The information docking personnel of various departments are also constantly survival of the fittest, and the human resource structure under the financial sharing service is also constantly optimized, from the original 25 financial accounting personnel to a 10-person accounting team. Through the construction of Financial Shared Service Center, one accounting accountant and one cashier in each branch will be optimized and allocated, and they will be trained and selected for compound accounting, to promote the transformation from

traditional accounting to compound accounting and stimulate their financial level and financial ability to the greatest extent. The financial personnel in the Financial Sharing Center of JKJT company in City A will standardize, process, and improve their work and timely process, analyze, calculate, and modify the data transmitted to the sharing center and be able to prepare financial budget according to the expense forecast provided by each business department and strengthen the budget management of the enterprise. The audit department and the decision-making department will integrate the internal data of the enterprise, prepare the financial statements, provide them to the internal and external users of the enterprise, and provide reliable advice for the decision-making direction of the enterprise management. The existing 10 financial personnel of JKJT in a city are proficient in accounting, auditing, and financial management theories and methods. They have worked in the enterprise for more than 5 years, are familiar with the whole process of enterprise operation and management and the legal norms related to enterprise operation and management, and have solid theoretical basis and practical skills. Figure 7 shows the financial department before the establishment of the Financial Sharing Center. Secondly, the participants of JKJT of City A in this optimization of accounting informatization are familiar with the historical problems of each business module of the enterprise, have a more objective and fairer attitude towards the implementation of this optimization, and can provide objective, true, accurate, and reliable accounting information to the management. Figure 8 shows the financial department after the establishment of the Financial Sharing Center.

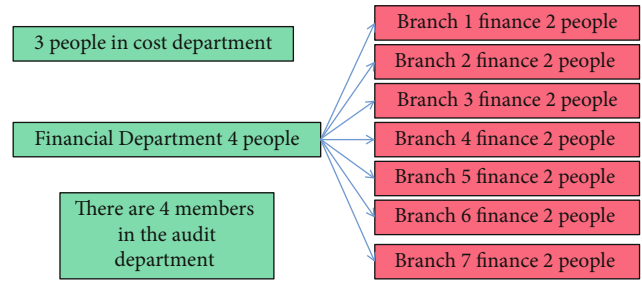


FIGURE 7: Financial department before establishing the Financial Sharing Center.

4.2.3. Management Structure Optimization. Under the financial sharing service, the accounting information reporting structure of JKJT in a city uses the flat management theory to “flatten” the spiral reporting relationship into two layers. The first layer is the operator who participates in the informatization, and the second layer is the decision-making layer who obtains the information. There is no management structure with other reporting relationship in the middle, which makes the baton of the decision-making layer play to the lowest level and can also obtain the feedback of more operators. The operator can also directly listen to the decision-making intention of the decision-maker, to improve the implementation efficiency of the enterprise. The optimization of management structure in the process of accounting informatization of JKJT in City A reduces the level and path of financial information reporting, effectively strengthens the enterprise’s response ability to various information, improves the processing speed of financial data, and effectively improves the enterprise’s own operation efficiency and competitiveness in the market. The specific relationship is shown in Figure 9.

4.3. Cost Accounting and Accurate Optimization of Project Technical Quotation Effect Analysis

4.3.1. Improve the Efficiency of New Product Cost Budget and Quotation Information. After the implementation of the

accounting informatization optimization of JKJT in City A, the actual cost method is used for the cost calculation of the enterprise. Through the optimized informatization business process, the financial cost accounting personnel can use the system to collect the production output and expense amount. Set the total cost allocation proportion and coefficient according to the actual change index of each month, so that the system can calculate the actual unit product cost, and the financial department will transfer and share this information to relevant user departments, such as R&D technology department and sales project department. At the same time, the system provides the calculation of standard product cost according to the production BOM structure. Firstly, the technology department provides the standard BOM structure of standard products. Secondly, the purchasing department needs to provide and maintain the standard purchase amount of standard purchased parts in finished products. Thirdly, the production department provides standard labor and machine hours. Finally, the financial personnel calculate the standard cost of products through the system. The management can compare the actual cost with the standard budget cost and give the quotation of standard products. Through the optimization of cost accounting method, it can change the previous way of using a single standard fixed cost to estimate the product cost, which can more truly reflect the budget of new products and improve the accuracy of quotation information. Before the optimization of accounting informatization, the product cost of JKJT in a city is calculated through the electronic version of the manual accounting quotation. Every time the product formulated by the customer needs a temporary quotation, the cost accountant needs to find out the electronic data; query the product classification, product BOM structure, and the price of standard purchased parts; and calculate the average standard cost of the product after 10 to 20 minutes. Then, it will be submitted to the R&D department, plus the hardware cost of R&D technology. Finally, it will take half an hour to send the quotation deemed reasonable by the management to the customer. Now, after accounting the product cost every time, the financial personnel will transfer the reasonable and accurate actual cost amount to the relevant departments, and the system will save the price. After obtaining it every time, they only need to enter the product classification or product name, which is convenient and accurate, and there is no need for the R&D department

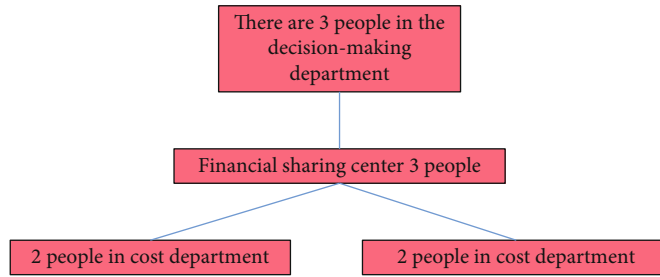


FIGURE 8: Financial department after establishing the Financial Sharing Center.

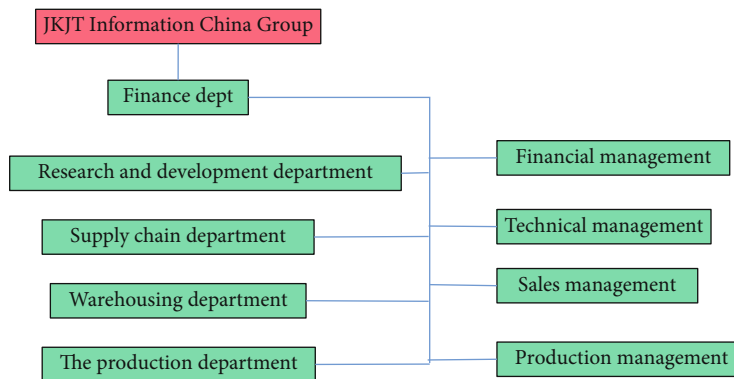


FIGURE 9: Management structure and reporting relationship after informatization optimization.

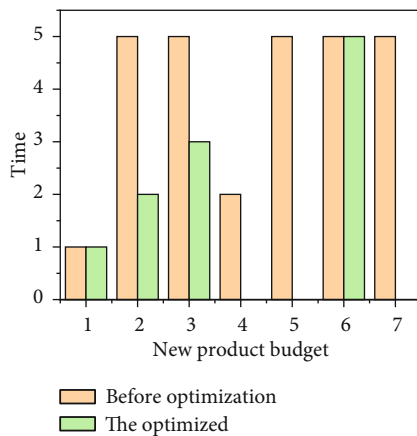


FIGURE 10: Comparative analysis of new product budget and quotation in City A.

to add the technical cost repeatedly, so as to improve the budget and quotation efficiency of new products. Figure 10 and Table 3 show the comparative analysis of the budget and quotation of new products in City A.

4.3.2. Implementation and Monitoring of Project Progress. CRM system and BPM system are two additional business interfaces needed by JKJT in a city in order to manage the optimization and implementation of accounting informatization. The management can grasp and supervise the sales staff's visit to customers in real time through CRM system,

improve the sales service of marketing, and achieve the policies of presales control, in-sales supervision, and after-sales service. At the same time, the salesperson can record the content of his visit at any time through the mobile app and transfer it to the Financial Sharing Center. The system can summarize and process this information uniformly, turn the business information into financial data such as working hours and commission basis, and reduce the statistical work of zero added value of the human resource department. For project-based sales business, the salesperson can timely transmit the project progress and project stage report to the financial department through BPM system, so that the financial department can read the project contract in time, understand the conditions of project progress payment and payment budget, and obtain linkage information in enterprise budget management. At the same time, the financial department can also act as the supervision department to supervise the project completion of the sales department, promote the project completion efficiency, improve the payment collection efficiency, and enhance the cash liquidity of the enterprise.

4.4. Analysis on Optimization Effect of Financial Sharing Management

4.4.1. Reduce Operating Costs. The higher the level of accounting informatization, the greater the space of financial management. Under financial sharing, enterprise accounting personnel will collect zero value-added businesses from redundant departments for unified treatment and appropriately

TABLE 3: Comparative analysis of budget and quotation of new products in City A.

New product: double yellow signal lamp hanging	Before optimization	New product: double yellow signal lamp hanging	After optimization
Finance department		Financial department	
(1) Product classification; signal lamp	1	(1) Product classification; signal lamp	1
(2) Product BOM structure	5	(2) Replace BOM structure	2
(3) Steel price converted from 5 m cantilever	5	(3) Delivery declaration	2
(4) Standard man-machine working hours	2		
(5) Communication check	5		
R&D department		R&D department	
(6) Hardware cost	5	(4) Confirm approval	5
Approve new product budget and quotation	5		

adjust the positions of redundant personnel to reduce operating costs. At present, the first major direction of JKJT’s enterprise financial management in City A is remote management and centralized processing. Since the establishment of the Financial Shared Service Center in 2019, in order to realize the application of financial shared services and the centralized management of financial funds, the financial personnel of 7 branches have been transferred to the sales department, respectively. The financial department of the head office of City A remotely manages the financial affairs of the branches and implements the centralized processing of the Financial Sharing Center for the expense reimbursement, contract review, salary accounting, collection, and payment business, and accounts receivable and payable business of the seven branches. Through accounting informationization and Internet technology, financial resource management is centralized and centralized allocation and unified control of enterprise funds are implemented. Reduce unnecessary cash outflow items outside the business decision-making, strengthen the decision-making ability of the management, and improve the utilization effect of funds within the decision-making. The finance department of the head office uses the accounting information management method. Understand the current situation of each business line of each branch, control the internal resources of the enterprise in real time, especially pay more attention to and integrate the internal financial resources of the company more efficiently, effectively improve the utilization rate of funds, and reduce unnecessary operating costs, as shown in Figures 11–15, which are the main financial indicators of City A.

The sales expense in 2018 was 12.474 million yuan, an increase of 1.5839 million yuan over 2017, a year-on-year increase of 14.45%, which was mainly due to the employee salary of 6.692 million yuan, an increase of 201100 yuan over last year, and the addition of branch employees. In 2019, the increase of management expenses was less and the increase of sales expenses was higher. The main reason was that after the construction of the Financial Sharing Center, the management structure was simplified, the financial personnel were transferred, the personnel of the sales department were increased, and the employee salary was 10.8851 million yuan, an increase of 4.1931 million yuan compared with last year. After expanding the business

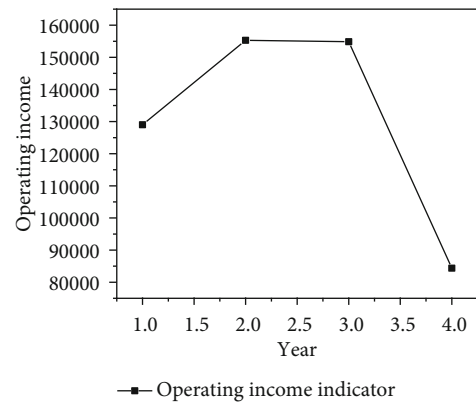


FIGURE 11: Operating income indicators of City A from 2017 to 2020.

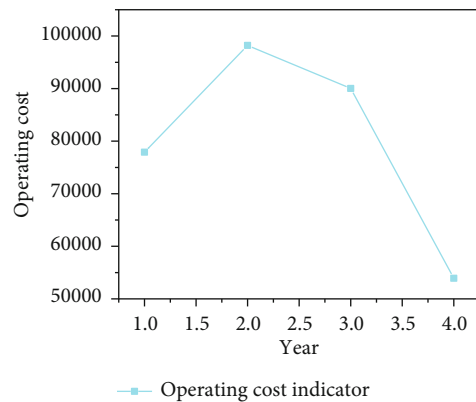


FIGURE 12: Operating cost indicators of City A from 2017 to 2020.

area, the company’s annual performance in 2019 was good, and the provision of year-end bonus was increased compared with last year. In 2019, the operating cost of JKJT in City A was RMB 90.0309 million, a decrease of RMB 8.1781 million compared with that in 2020, a year-on-year decrease of 8.33%. The main reason is that the financial sharing mode was established in 2019, and the financial

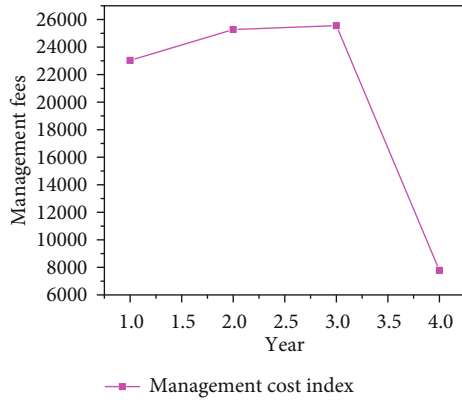


FIGURE 13: Management expense index of City A from 2017 to 2020.

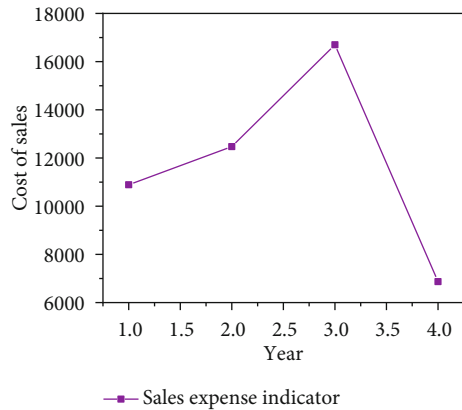


FIGURE 14: Sales expense index of City A from 2017 to 2020.

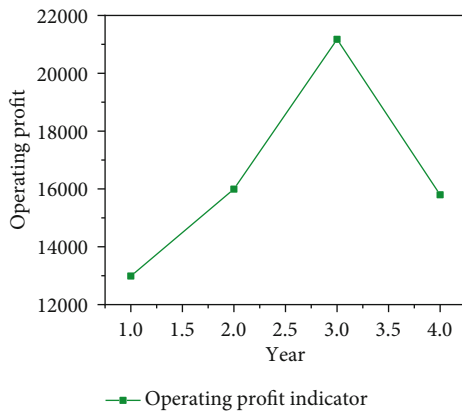


FIGURE 15: Operating profit index of City A from 2017 to 2020.

department strengthened the control of cost management and funds of branches. At the same time, the acceptance measurement of the local project in City A was RMB 57.0251 million, because the project operates locally, the advantages of financial services are obvious, and the cost is relatively low.

4.4.2. *Improve the Efficiency of Obtaining Information.* The optimized accounting information management mode will reduce the time difference in enterprise operation and management, enhance the information processing ability of the business department of the enterprise, strengthen the cooperation with finance, achieve the purpose of enterprise collaborative management, and effectively reduce the inconsistency and asymmetry of the information of each business department, to quickly obtain effective business information. After optimizing the accounting informatization, JKJT of City A added the management of production core business chain and optimized the problem of asymmetric information between sales and warehouse business, so that the financial department can call the system inventory data at any time, quickly analyze and form the financial data information report of enterprise inventory assets, and realize the dynamic supervision of the financial department over each business department. JKJT company of a City applies long-term and development vision, adopts economies of scale, invests and utilizes more business modules, develops more business interfaces, and summarizes different economic and business processes of different business departments into Kingdee K3, an enterprise accounting information management software, for real-time tracking, processing, and sharing. In addition, it can timely find the stuck points of the enterprise process value, conveniently and quickly coordinate all business departments to find out the causes of the problems, continuously optimize and deepen the mining of the value of the business process, further coordinate the work between various departments, and improve the efficiency of obtaining information. The better application module of Nanchang JKJT in accounting informatization lies in the purchase process of productive materials. When the production planner regularly uses the system to check the warehouse inventory, the system will alert the materials lower than the safety inventory and remind the planner to purchase materials. Unlike before, the planner has to ask the warehouse manager for the required materials before making a purchase application. Subsequently, after logging into the system, the purchaser will be prompted that a planner in the production department has a purchase demand, and the purchase business department will track it. At the end of the business, the financial department agrees to be able to query the required information, such as whether the production material application is reasonable and whether the purchase price is within the price policy. The accounting information system can provide information quickly and provide work efficiency.

5. Conclusion

Based on the analysis of the current situation of business process management, this paper puts forward the business process management technology based on ontology. Combining ontology technology and case-based reasoning technology, a business process knowledge base is established to avoid the repeated design of business processes, realize the sharing and reuse of processes, and facilitate the interoperability between systems. Optimize and analyze City A in

various fields: cost accounting, accurate optimization, project technical quotation effect analysis, financial sharing management optimization effect analysis, business system data authenticity and accuracy optimization effect analysis, and post and enterprise personnel structure optimization analysis. Through these optimized data, the business process concept is described based on ontology, which makes the concept clearly defined, realizes the consistency of semantic understanding, eliminates the obstacles to the understanding of business requirements, reduces the loss of functional requirements, and reduces the risk of process management. Based on the idea, the business process knowledge base is established to support the addition, deletion, and modification of process cases; realize the management of process knowledge base; and provide work efficiency. Under the background of the rapid development of big data and information technology, the enterprise accounting informatization under the financial sharing service should pay attention to the selection of appropriate implementation scheme. The enterprise management should attach great importance to it, strengthen the training of financial management talents, and continuously optimize the business process. With the continuous development of economy and technology under the background of the times, financial shared services will continue to join the core business processes of enterprises, which lays a theoretical and practical foundation for the deepening and fine management of enterprises. In the future development, the business process needs to be continuously optimized, and the financial personnel need to master more information technology knowledge. The operators of each business department should maintain the ability and enthusiasm to accept fresh objects. The enterprise management should also maintain the sensitivity to policies and economy, grasp the opportunity, and promote the enterprise to take off again.

Data Availability

The labeled datasets used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no competing interests.

Acknowledgments

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References

- [1] X. Zhao, S. Yongchareon, and N. W. Cho, "Enabling situational awareness of business processes," *Business Process Management Journal*, vol. 27, no. 3, pp. 779–795, 2021.
- [2] Y. Zhu, Y. Peng, S. Wang, S. Shi, and N. Ji, "Research on road traffic situation awareness system based on image big data," *Journal of Physics: Conference Series*, vol. 1650, no. 3, p. 32170 (6pp), 2020.
- [3] Y. Ren and Y. Yan, "Research on the process design of real estate project audit based on computer," *Journal of Physics: Conference Series*, vol. 1992, no. 2, p. 22146 (5pp), 2021.
- [4] J. Qu, "Research on mobile learning in a teaching information service system based on a big data driven environment," *Education and Information Technologies*, vol. 26, no. 5, pp. 6183–6201, 2021.
- [5] G. A. Gareeva, D. R. Grigoreva, and I. I. Mahmutov, "The process of management and control of feasibility planning of road construction using the financial information system," *International Journal of Financial Research*, vol. 12, no. 1, p. 184, 2020.
- [6] Y. Sang and S. Tian, "Research on master data recognition of tcm based on analytic hierarchy process," *Journal of Physics: Conference Series*, vol. 1941, no. 1, p. 12020 (7pp), 2021.
- [7] H. Zhang, S. A. Padua, and Y. Li, "Research on the design of preschool education management information system based on computer technology," *Journal of Physics Conference Series*, vol. 1915, no. 2, p. 22003, 2021.
- [8] R. Aurachman, N. I. Utama, and J. Habibie, "Information system control and improvement process design based on clause 8 ISO 20000-1: 2018 using SysML language," *Journal of Physics: Conference Series*, vol. 1764, no. 1, p. 12178 (5pp), 2021.
- [9] Y. Zhang, J. Fu, H. Sun, and H. Liu, "Research on microstructure and hardness of aisi1050 disk based on FDM and FEM methods during quenching process," *Journal of Physics: Conference Series*, vol. 1885, no. 2, p. 22030 (8pp), 2021.
- [10] F. Xu, S. Tao, G. Li, Y. Xie, and Y. Tao, "Research on cross-network exchange method of enterprise application business process data," *Journal of Physics: Conference Series*, vol. 1693, no. 1, p. 12037 (10pp), 2020.
- [11] X. L. Zhu, P. Lin, and Y. Liu, "Research on the method of information system equipment performance analysis based on big data," *Journal of Physics: Conference Series*, vol. 1883, no. 1, p. 12163 (6pp), 2021.
- [12] A. V. Kostikova, I. A. Tarasova, N. V. Kazanova, and E. G. Kriuklyakina, "Development of an effective business intercommunicating system based on the electronic document management introduction for a construction company," *IOP Conference Series: Materials Science and Engineering*, vol. 913, no. 5, p. 52023 (7pp), 2020.
- [13] Q. Wang, J. Zhang, L. Fan, and X. Cao, "Research on the whole process engineering consulting mode of smart hospital based on BIM project management mode," *Journal of Physics Conference Series*, vol. 1744, no. 3, p. 32205, 2021.
- [14] L. H. Zhang, Y. Liang, Y. Tang, S. Wang, C. Tang, and C. Liu, "Research on unknown threat detection method of information system based on deep learning," *Journal of Physics: Conference Series*, vol. 1883, no. 1, p. 12107 (6pp), 2021.
- [15] Y. Yu and Y. Sun, "Research on visual communication graphic design information system based on computer simulation," *Journal of Physics: Conference Series*, vol. 1952, no. 2, p. 22032 (6pp), 2021.
- [16] Y. He, Y. Yiyang, D. Yijie, R. Yingwen, and L. Xinyi, "Research on alarm association mechanism of information system based on FP-growth algorithm," *Journal of Physics: Conference Series*, vol. 1693, no. 1, p. 12082 (5pp), 2020.
- [17] A. Zhu and D. Hao, "Research on decision support system of ship planning management based on data warehouse," *Journal of Physics: Conference Series*, vol. 1651, no. 1, p. 12082 (4pp), 2020.

- [18] X. Jiang and W. Dang, "The research of quantitative evaluation algorithm of process auto alarm analysis based on Chem-HRA," *Journal of Physics: Conference Series*, vol. 1813, no. 1, p. 12056 (8pp), 2021.
- [19] Q. Zhu, Y. Liu, Y. Shen, and Z. Zhao, "Research on intelligent damage assessment system for time-sharing rental vehicles based on image recognition," *Journal of Physics: Conference Series*, vol. 1880, no. 1, p. 12012 (6pp), 2021.
- [20] A. D. Camara and X. D. Gao, "Research on information processing in management information system of Sogufret S.A.R.L Company in guinea based Levenshtein algorithm," *Journal of Physics: Conference Series*, vol. 1820, no. 1, p. 12155 (6pp), 2021.
- [21] Z. Qi, Y. Zhang, L. Fang, M. Jia, and G. Lin, "Effects of gamma and electron beam irradiation on FBG and DFB-FL," *Journal of Physics Conference Series*, vol. 2112, no. 1, p. 12005, 2021.