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The Research of Business Process Management-based on The Changqing Oil Field Cooperation Project

Abstract This paper elaborates on defects in the Petrol-China Changqing Oilfield Cooperation Management Project in an attempt to improve future cooperative efforts. The paper focuses on the drawbacks in the existing management process and analyzes the process by using current information management methods. This effort is made in hopes of arriving at the most efficient and effective method to redesign the existing processes.

Keywords: cooperation project, process optimization, management, improvement

1 Background

Business process management is an essential way for an entity to achieve sustainability. The Changqing Oilfield Cooperation Project has established a basic management system. However, there are still some shortfalls, such as how to make the project management system more effective and efficient through business process management. Achieving this would mean profound advantages in the real business world and would also prove applicable to the operation of the international cooperation. Moreover, it is an important effort towards improving process management in the ongoing Changqing Cooperation Project.

2 Business process and management improvement

Research on process and process management began in the 20th century, when Professor Hamer (1990) first introduced the concept of business process reengineering (BPR). After Hamer, many researchers became involved in this field and started researching in different perspectives, substantive, and theoretic (Hui & Yao, 2009; Tang, Hui, & Yao, 2010; Lin, 2011; Hui, Feng, & Hu, 2012; Li, 2014).

In 1994, BPR was first introduced into China. Since then the theory has been enriched and developed in several industries. Additionally, the theory has been combined with those of supply chain, value chain, activity based costing, and balance scorecard. However research is still restricted in the interrelationship of each element and the effect of the revolution of organizational structure.

Many researchers point out that it is unnecessary to redesign, or reengineer the existing operational process in a revolutionary way; instead, they believe that the modification of the existing process could achieve the management objectives.

According to the policies launched by the state department, PetrolChina is determined to spend two years on improving the management since May 2015. Petrol-China has restructured and redesigned the management process and regards the improvement as the biggest challenge within five years.

3 Optimize progress of cooperative project

3.1 History and current situation

In the overall scope of cooperation, we not only brought in funds, technology, and management from a foreign country, but also explored and developed oil and gas resources. Before 2002, China had signed 51 contracts with 45 overseas oil companies, covering 250,000 square kilometers, bringing in some 1.3 billion dollars. Offshore, China signed 154 contracts and protocols with 70 overseas

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oil companies, which covered 120,000 square kilometers and brought in 90 billion dollars. The 13 cooperative ocean oilfields are now depleted and capped.

When China cooperated with oil projects internally, the cooperative area and the scale became bigger. At the beginning, recoverable oil reserves could not be found, but crews and engineers persisted and finally tapped the significant sub-ocean reserves. There are two cooperative oilfields, the Tarim Oilfield and the Yumenguan Oilfield, both of which have been explored and to a great extent developed. Apart from those two fields, China has some 11 others. For domestic and overseas companies, there are 188 developing cooperative areas, and 66 cooperative contracts. The total investment is 29.3 billion CNY. The oil/natural gas well is currently producing over 22 billion CNY. After cooperating with others, the new oil/gas well increases production by nearly 8 billion CNY, resulting in an increased oil output of 38,140,000 tons and increased gas production of 2,340,000,000 steres.

In 1999, the Changqing Oilfield had only 1 cooperative project. But now, it has 17 cooperative projects in 4 provinces and 11 counties employing 3,000 personnel on cooperative projects. In 2013, the oil and gas produced totaled over 5,000,000 tons. The final result was a significant portion, 5 million tons, toward the company's overall annual production. Providing energy is the key point to rapidly increasing a nation's economy, keeping its people safe, proud, and filled with hope for the future. Since 1993, China has been a net exporter of energy. In the future, energy needs will be even greater.

The newest oil and gas resources evaluation results show low-grade oil and gas of the total oil and gas resource are 54% and 50%, respectively. If companies expect to achieve sustainable development and keep the safety of providing energy, they need to develop production efficiency and management ability. Among national petroleum strategic interests, most prominent is the benefit of providing safe and cheap oil for generations to come.

3.2 Optimize the flow of objective and principle

3.2.1 Objective

Management of the company will quickly become standardization, modularization, and informatization. It needs to develop the quality and standard of the company. It must also develop management efficiency to make Western China its base of operations.

Basic management must be streamlined and efficient. The quality, measurement, standardization, rules and regulations need to be perfected. The ideal management is centralized, concise, and effective.

The structure of staff requires each of its team members to be logical, straightforward thinking, with concern for fulfilling legitimate organization goals and not personal agendas. Management must show itself as confident and

vigorous, not given to wastefulness or dodging duties. Organization is self-proven in its effectiveness.

Management and decision is scientific. The execution of both policy and project requires an unhindered flow of orders and information to team members. Competitiveness in China's marketplace is already becoming stronger and will consume all who are idly waiting to copy the initiatives of rival companies.

3.2.2 Principle

To optimize flow is the guide and the original management principle. According to the requirements of optimal flow, the right work is accomplished. It develops operational efficiency and is prepared whenever the department's performance is evaluated.

Staff quality and the work environment are also seriously considered. The maximum potential of resource is very important when operational flow is designed.

Information technology is a tool. Now digital oilfields are built by many oilfield companies, especially leading oilfield companies. A digital oilfield has become a strategic target in every oilfield company. Therefore managing information technology has become an indispensable approach. Information management is the profound impact of management (Chu & Wang, 2012).

3.3 Optimization

Process analysis and management is a big workload. The research includes processing documents, business flow charts, and instructions of document processing, and flow of outward service cooperative project content (Table 1), and so on. The value of operational flow in researching is that existing operation flow can understand flow well and the operation is visualization and standardization. At the same time, efficiency and the effect of operational flow must be clear.

The optimum objective is determined through systematic and comprehensive research and analysis of the operation flow problem.

To analyze existing operational flow and understand key points of existing flow and process, problems of flow are found and the relevant department is optimized. At the same time, relevant staff is asked for opinions, and the advantage and disadvantage of existing flow is explained. Then new flow is designed to enhance operability (Wang, Lan, & Yu, 2006; Liu, Zhao, & Liu, 2012).

Objectives and principles of flow are understood from flow research and analysis. Unreasonable parts will be improved, unnecessary flow simplified and non-value creating flow combined. It will structure best-match and most efficient flow.

According to the objectives and realized conditions, optimized flow is evaluated. It means efficiency and real effect are evaluated. It determines optimize flow and

Table 1*Changqing Flow of Outward Service Cooperative Project Content*

Progress No.	First flow	Second flow	Third flow
SP03	Developing		
SP03.04		Developing a oil and gas resource plan	
SP03.04.02			Oil and gas resource long term plan
SP04	Management plan		
SP04.12		Oil and gas resource annual investment plan	
SP04.12.01			Oil and gas business annual investment plan
SP04.12.02			Oil and gas business annual investment plan issued and executed
SP04.21		Company budget	
SP04.21.02			Annual budget scenario
SP04.21.03			Executed and controlled budget
SP04.21.04			Check and evaluated budget
KP02	Developed oil and gas resource		
KP02.02		Oil and gas resource design scenario	
KP02.02.01			Prior period of project
KP02.02.03			Check and approved scenario
KP02.02.04			Evaluated scenario
MP02	Finance management		
MP02.15		Finance report	
MP02.15.01			Internal finance report
MP04	Goods and materials management		
MP04.01		Purchase management	
MP04.01.01			Goods and materials purchasing
MP05	Treasury management		
MP05.01		Oil and gas resource management	
MP05.01.07			Scrapped and disposed oil and gas resource
MP05.01.10			Check oil and gas resource
MP09	Contract and disputed management		
MP09.01		Contract management	
MP09.01.01			Check the contract
MP09.01.02			Contract evaluation, modification and relief
MP09.02		Dispute management	
MP09.02.01			Dispose dispute

adjusts steps.

According optimize flow evaluated, operation flow is optimal, consummate and improved in the process. It will generate a self-improvement mechanism.

4 The experience based on the Changqing cooperation project optimization

4.1 Delicacy management

It is necessary to make in-depth study about geological

research to discover new reservoirs, to improve the ability of development, to reassess the existing reservoirs in order to provide steady production to the market.

It is important to concentrate on management both from a macroscopic perspective and a microscopic perspective. In the process of cooperative development projects, the regulations and technologies could be designed, especially for the details. Thus, the appropriate approaches could be provided. The technologies of switch for water plugging, old temporary plugging fracturing, gyro balancing are used to understand oil deposits and the technologies of hollow sucker rod, closed production are improving the ability of

development.

The measurements and suggestions should be tailored to each job and a project management team could be established to evaluate the cost, amount of production, production index, resource management, chemical compounds, clean energy, etc. The project team would allocate the responsibilities of each subsidiary branch and supervise from a comprehensive view.

In addition, internal control must be settled based on the principle of segregation of duties. Only in this way can the project manager be responding to the tasks he is assigned.

Finally, cost saving must be encouraged within organizations. Each individual should be motivated to be involved in these activities such as Quality Control.

4.2 Security and environmental protection

4.2.1 Reduce risk at source

Promoting standardizing design, modularizing structure and digital management in the operational processes are necessary for desired results.

Regarding digital management as the key term in improvement activities and creating a system with operational functions, emergency warnings and security and environmental protections, this system would be utilized in order to complete scheduling control, emergency control, security warning, cost reduction, management hierarchy simplification, and effectiveness improvement. Simultaneously, structure the digital control system in order to speed up the pace of change in the organizations and reduce the security risks at their sources.

4.2.2 Segregations of duties

According to the requirement of segregation of duties, the organizations should make their employees take responsibility for their duties. It is required that design, purchases, and construction duties are allocated to corresponding individuals and the contracts and reward systems are well-settled. Only in this way can the control of both objectives and processes be achieved.

4.2.3 Promote the standardizing process

Management will prioritize promoting the standardizing processes and combining the processes with education and training. Education and training programs should match the demands of the responsibilities of employment and meet the objectives of the organization as a whole. Education and training programs should make detailed reference to the contexts of each job, and the employees should be encouraged to grasp the basic skills, recognize the risks and improve their abilities to deal with emergencies. In order to

achieve these goals, the ability of analyzing the risk and completing control activities should be strengthened.

4.2.4 Complete the preventing system

Great efforts are to be taken to control and supervise the risks of oil and gas leakage. First, make clear the responsibility of each employee in the different hierarchies. Second, confirm the risk control systems are well structured. Third, establish a dynamic environmental assessment data base in order to create a digital information assessment system. As a result, the appropriate actions could be taken to reduce the risk of oil and gas leakage.

4.2.5 Establish efficient and environmentally friendly organizations

It is important to embed the concept of environmentally friendliness and social ethics in the course of running a business. According to the policies set by the head office of the PetrolChina, all the construction must be reevaluated and assessed to reduce the resource slacks and supervised based on the rewarding legislations. The policies would require carbon dioxide emission to be monitored and reduced by strengthening the duties of each individual. Additionally, the approaches of monitoring and supervising could be developed at the same time in order to improve water environment and detect exhaust gas. Clean energy could be encouraged to switch to operational capacity in order to boost the development of the processes of generating and recycling oil and gas. According to the requirement of local government, the plan of biological construction and recovery of the environment should be launched annually.

4.3 Risk management

4.3.1 Improve the ability of risk control

The emergency warning system would be strengthened in order to improve the accuracy of the database and system. The construction, supervision and modification should be developed embedded in the internal system. The ability of detecting, preventing, and controlling the emergencies should be completed in order to complete the assessment, evaluation, dynamic supervision and routine management, then, the risks could be effectively reduced.

4.3.2 Launched advertisement about laws and regulations

First, by utilizing the technology of distance education, make the employees familiar with the laws and regulations. Set the objectives of learning laws and regulations and motivate individuals to study the legislation. Additionally,

the result of the training should be regarded as one of the benchmarks for the annual rewards. Third, relevant meetings could be used to communicate the understanding of the training program. The corporation must summarize the appropriate materials and training programs in pushing the laws and regulations within the organization. By these, the compliance risk could be effectively prevented.

4.3.3 Optimizing job prevention guide

First, the job prevention guide should be modified and perfected to make it more useful. Second, employees should be familiar with the guide and commence their work under the guidance. The organization should control the process via the compliance tests. Third, the work should be divided carefully and eliminate any work that is unnecessary. This may help the company redesign the responsibilities of each job, reallocating the job to each individual. The modified processes would make the company more effective and efficient.

4.3.4 Optimizing outsourcing management

Each department should reconsider outsourcing partners, the preparation of the contract, negotiation agreement, training, management and supervision, assessment and recording in order to ensure the ability of each outsourcer and the evaluation of HSE. The evaluation could confirm the performance, management, resources availability of the outsourcer. The contract of the outsourcing should include the responsibilities of each party, the standards of the work, the professional skills that should be required by the employees and the goals of the work. The outsourcer with unsatisfying records should be eliminated from the list immediately. The standards that should be used for choosing the outsourcing partner is switching from concentrating on quantity to the quality.

4.4 Optimizing the management system

4.4.1 Motivating digital management system

The Changqing Oilfield Cooperative Project is based on automatic technology, computer science, and internet communication technology. The production data could be monitored timely and the production processes could be automatically worked. Digital management does not simply convert information to the digital data, on the contrast, the management method focuses on the combination of digitization and engineering software development, the approach could connect to the operation, security, conduct and warning. This could make the data be used to improve production, security, process monitoring and effectiveness.

4.4.2 Construction plan of digital management system

First, based on the operational unit process control, the management system should be made to take advantage from point to line to station. The oilfield is basically structured by “point-to-line-to-station” model, this can be regarded as the beginning of the production. The feature of this can be described as high quantity, heavy workload, and repetitiveness. In order to construct the system, it is important to control each unit of production. Second, production, scheduling, and environmental control are the core elements in this operating system. The overall control on the gas and oil could be more scientific and effective. Third, storage of the gas and oil would be the last stage in the development and this is the party that requires more information and intelligence.

4.5 Oildom cooperation project

4.5.1 The project changed the traditional method of oil extraction

Digital management makes the operation become more information based, automatic and intelligent. First, the job of batting balls could be automatically controlled instead of controlled by individuals. After the installation of machinery that could be used to bat balls, the balls could be batted ten to fifteen every time. Second, in the station, an indicator diagram could be used to change the traditional method. The new approach could make the timely monitoring, video identification come true. Third, in the operational processes, the check work used be finished by individuals could now be conducted by intelligence. Video technology could achieve the effective monitoring and control software to let the management be more intelligent, automatic, and accurate.

4.5.2 The profitability could be increased by the cooperation project

For example, the investment saved on the oildom is 3.62 million CNY and the cost of construction of digital systems is 3.93 million CNY. The investment is balanced. However, costs could be saved in the later stage and increase the profitability. In the last two years, the Changqing Oilfield has become one of the most valuable oilfields in China, the quantity of oil and gas reached 0.5 million.

4.5.3 The resources could be saved and the environment pollution could be controlled

The new design of the Oildom requires less land and steel. The digital system has reduced labour workload. Then, the

risks of the security are reduced, costs have been saved and the environment has been protected. The application of computer control technology could take the responsibility of saving electricity and water, reducing pollution.

5 Conclusions

The resource companies have a close relationship with the nation. The things that we could do include becoming innovative, regulating the responsibilities, and completing a digital management information system. With the integration of new resources, management of the project could show improvement in this and all projects that follow.

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