Study on Collaborative Governance Methods of University Research Projects Based on Process Reengineering

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Abstract. This paper aims at the common problems existing in the management of university scientific research projects construction in China, such as lack of process management, unclear organizational structure and business process, unclear responsibility orientation of the main body participating in project construction management, low level of collaborative management and knowledge management, etc. Based on the upsurge of organizational digital transformation under the current background of digital intelligence era, the paper introduces the theory of business process reengineering and the concept of modern enterprise business process management, and puts forward a set of "Three-Stages and Twelve-Steps" business process reengineering method suitable for collaborative governance of university scientific research projects. This new collaborative governance model based on the business process of university scientific research projects is constructed from 3 aspects: collaborative entity, collaborative system and collaborative capability. This new model is conducive to positioning collaborative entity in business process, forming process-based collaborative governance organizational form, explicitly establish the collaborative system and improving collaborative capability. It also helps to explore feasible ways for digital transformation of university scientific research project management, and comprehensively improve the collaborative governance level of scientific research projects in colleges and universities.

Keywords: process reengineering; university; scientific research project; collaborative governance；digital transformation.

1 INTRODUCTION

The government work report of the NPC and CPPCC in 2024 pointed out that it is necessary to speed up the promotion of high-level science and technology for self-reliance. Aiming at the major strategic needs of the country and the needs of industrial development, it will deploy and implement a number of major scientific and technological projects. As the main task force of scientific research projects, colleges and universities undertake a large number of scientific research projects. How to effectively coordinate the management of scientific research projects and improve the

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level of collaborative governance and the effectiveness of scientific research project construction is an urgent problem to be solved. At present, there are three main problems in univerisity scientific research projects, as below:

First of all, the management of the implementation process of university scientific research projects is relatively weak. Sun Wanruo (2023) argues that university scientific research projects lack regular evaluation and follow-up[1]. Xu Jiajia (2021) pointed out that under the background of the current era, the management of scientific research projects in colleges and universities generally presents the characteristics of emphasizing project declaration but neglecting project management[2]. Yan Zhiyu (2014) pointed out that colleges and universities generally have the problem of "emphasizing both ends while neglecting the middle part" for scientific research projects, that is, paying attention to project declaration and achievement output, while lacking effective dynamic monitoring mechanism for the whole implementation process of projects[3]. The blank of process management will make university scientific research projects face greater risks in project schedule, quality, cost, risk control and audit supervision.

Second, the management university scientific research project generally has unclear role orientation, which does not realize reasonable division of labor, and the functions of organization are separated, the right and responsibility distribution is unequal. Zhang Yingqi pointed out that there are problems such as imperfect scientific research management system and poor connection between functional departments[4]. The separation of rights and responsibilities and the absence of systems has greatly restricted the efficient operation of university scientific research projects.

Third, the collaborative management and knowledge management of scientific research projects in colleges and universities are relatively lagging behind, due to the lack of information sharing mechanism of business process and data co-management that can be achieved by IT system, and no collaborative management system has been established. Zheng Aiping (2016) and some others believe that the business functions of university scientific research management in China are generally separated, they often subordinate to different departments, lack of overall coordination among departments, which make it hard to establish an interactive platform for scientific research management interconnection and sharing[5]. The obsolete management mode and the neglect of IT system lead to the stagnation of the management of university scientific research projects in China.

Under the background of digital intelligence era, it is urgent to promote the information construction of university scientific research project management, strengthen the project management capability. The digital transformation based on process reengineering and collaborative governance, provides new ideas and methods for solving the above problems.

2 COLLABORATIVE GOVERNANCE AND PROCESS REENGINEERING OF UNIVERSITY RESEARCH PROJECTS

The management of university scientific research projects should grasp the key nodes and strengthen the process management from the perspective of business practice. Based on the theory of process reengineering and collaborative governance, this paper optimizes the management mechanism of scientific research projects in colleges and universities, systematically analyzes the existing processes, and innovates the design and implementation on this basis. Which helps to identify key processes, evaluate process efficiency, simplify processes, realize process automation and standardization, establish cross-department coordination mechanisms, clarify rights and responsibilities, information sharing and feedback mechanisms, optimize university scientific research project management, and promote the smooth progress of scientific research work.

2.1 Collaborative Governance of University Scientific Research Projects

The word "collaboration" originated from ancient Greece and originally meant cooperation and coordination. Elizabeth A. Koebele et al.(2023) pointed out collaborative governance as a way to mitigate conflict, they believed that people collaborate by changing the way they work[6]. Francesca Calò et al.(2024) considered collaboration to be the transformation of responsibility relations from bilateral to multilateral[7]. John Clayton Thomas, in Citizen Participation in Public Decision-Making: New skills and new Strategies for public managers, defines collaborative governance as "an institutionalized collaboration to achieve public ends"[8]. Seulki Lee et al.(2022) argued that responsibility relationships of collaborative governance are a shift from bilateral to multilateral relationships, involving horizontal and vertical accountability relationships[9]. Collectively, these views emphasize the important role of collaborative governance in facilitating multi-party cooperation, achieving common goals and improving accountability of various parties.

This paper makes a detailed discussion on the connotation underlying collaborative governance from the perspectives of horizontal collaboration and vertical collaboration. Horizontal Collaboration refers to the sharing of resources, information exchange and knowledge sharing between different departments or institutions at the same level to improve the work efficiency and decision-making quality. Li Zhuang (2023) and others pointed out that the vertical effect directly depends on the willingness and strength of coordination among various departments[10]. Shao-jie Yang put forward the horizontal Integrated Management System (IMS) model, from the matrix structure design, business process reengineering, integrated business management, management information construction, integrated personnel training, integrated culture shaping and so on, explains how to effectively realize the strategy, in order to support the enterprise transformation and enhance competitiveness[11]. Vertical collaboration refers to the organization of cohesion and cooperation, in which the resource information transfer

step by step, improving the efficiency of the organization. Ernst & young army think Vertical Collaboration refers to the cooperation and coordination between different levels in the supply chain or organizational structure[12]. Vertical collaboration through the optimization of information flow, logistics and capital flow, improve efficiency and response speed, reduce costs, enhance competitiveness. Horizontal and vertical collaboration, optimize the efficiency of collaboration between departments and levels, improve the conversion rate of information and resources, and enhance the overall work efficiency of the organization. This concept can play an important role in the process of university scientific research project management.

2.2 Business Process Reengineering(BPR)

Business Process Reengineering (BPR) is a management philosophy developed in the early 1990s by Michael Hammer and James Champy[13] who saw BPR as a radical, radical way of rethinking and designing business processes aimed at achieving significant performance improvements. Chan S L (1997) pointed out that business process reengineering had become a popular buzzword in management and information systems disciplines[14]. Li Shaofeng pointed out that process reengineering has been widely concerned and recognized by all sectors of society, and world-famous universities have also increased the application research of process reengineering in university scientific research management, in order to optimize the scientific research management mode of universities [15]. In terms of scientific research project management, Chang Guanghui (2017) and others put forward corresponding schemes for university budget management process reengineering[16]. The core idea of process reengineering is to abandon the traditional organization structure based on functional division and its related business processes, then to construct from scratch with more efficient and concise processes. Process reengineering is mainly based on process as the core, in practice, process as the main internal driving force, mobilize internal resources of the organization, eliminate constraints in the organizational structure, and achieve established goals.

3 BUSINESS PROCESS REENGINEERING METHODS FOR UNIVERSITY RESEARCH PROJECTS

At present, under the background of digital intelligence era, enterprises, administrative departments and other organizations are carrying out digital transformation practice, and universities, as an important force of scientific research work, should be in the forefront of digital transformation of organizations. Digitalized business process is the foundation of data, IT and application of organization digital transformation. Business process reengineering method is widely used in organization digital transformation. This paper absorbs business process reengineering theory and modern enterprise business process management concept, and divides business process reengineering method of university scientific research project into 3 stages and 12 steps，As shown in the following figure 1.

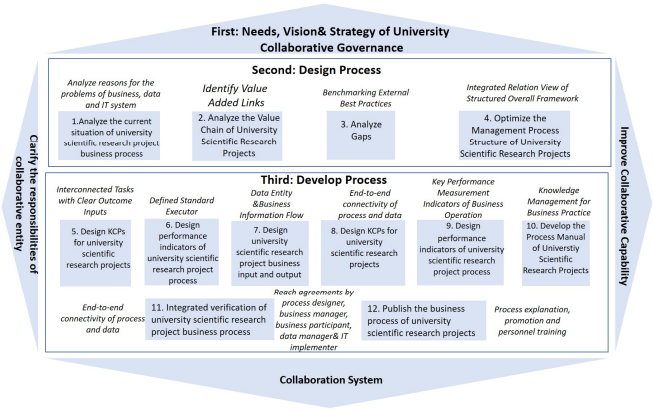

Fig. 1. Method of University scientific research project process reengineering-- "3-stage& 12-step"

3.1 Stage 1: Understanding University Strategy, Needs, and Vision.

Find out the orientation of university scientific research project construction in the whole university development strategy, clarify the boundary and interactive relationship between university scientific research project construction and university teaching management, university scientific research management, university administrative management, etc., clarify the business process structure relationship of university scientific research project, formulate clear and unified management structure, which is conducive to examining the integrity of business process coverage and avoiding gaps and breakpoints after process formulation， As shown in the following figure 2.

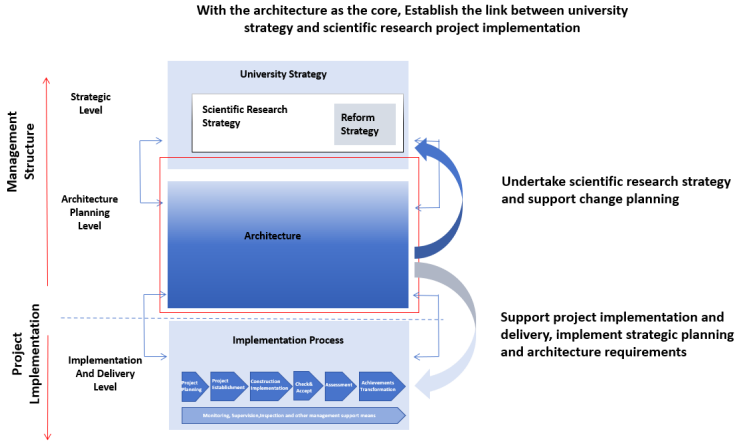

Fig. 2. Architecture connects university strategy and scientific research project implementation

3.2 Stage 2: Design Process.

Step 1: Analyze the current situation of university scientific research project business process. Through reviewing the business logic of the links such as project establishment, procurement, construction implementation, inspection and acceptance of scientific research projects in colleges and universities, the list of business scenarios covered by the process is determined to ensure that there is no omission, typical business samples are selected, the current business process of scientific research projects in colleges and universities is sorted out, and the schematic diagram of the current process is output. Identify problems and gaps in the combing process, classify and analyze reasons for identified problems as key inputs to process reengineering design.

Step 2: Analyze the main value chain of university scientific research projects. Michael Porter, a famous strategist at Harvard Business School in the United States, put forward the "Value Chain Analysis Method"(Michael Porter s Value Chain Model)[17]. Value chain analysis emphasizes that not every link in the value activities participated by different organizations creates value. In fact, only certain specific value activities can really create value. These real value-creating business activities are the "strategic links" on the value chain. Process reengineering theory considers that eliminating non-value-added links means reducing the number of non-value-added activities in the process and improving the quality of value-added activities.[18]When designing the planning and implementation process of scientific research projects in colleges and universities, we should accurately find out the main value chain of scientific research projects in colleges and universities, that is, the links that produce benefit value-added, weaken and eliminate the non-value-added links, and reduce the invalid consumption links such as repeated approval, waiting time and rework.

Step 3: Analyze the gap. One is to benchmark the successful scientific research project process management of the outside world and analyze the gaps existing in itself. Understand the best practices of scientific research project management processes in universities at home and abroad, identify the excellent practical experience required for benchmarking, analyze the gaps between business objectives, business boundaries, business steps, business inputs and outputs and business best practices, process performance gaps, IT function gaps, and improvement directions. The second is to identify the gap between the current business process and the post-reengineering process, and the gap between achieving the objective requirements of strategic objectives, and give improvement suggestions around the gap/status quo problems, and clarify the design points of the reengineering process.

Step 4: Optimize the management process structure of scientific research projects in colleges and universities. University scientific research project management process framework is a structured overall framework for university scientific research project management process, describing the classification, hierarchy, boundary, scope, input/output relationship of university scientific research project management process, reflecting university scientific research project construction management mode and business characteristics. The process architecture can be divided into four levels: the first level process class, the second level process group, the third level process and the fourth level sub-process. For example, the construction and imple-

mentation of software development scientific research projects should include specific business processes such as software requirements analysis, software design, software R & D, software testing, software check and accept, software project change management, etc. The architecture description document shall include key information such as process name, process code, process description, process owner, sub-process, input/output, process start point, process end point, process performance, etc. As shown in the following figure 3.

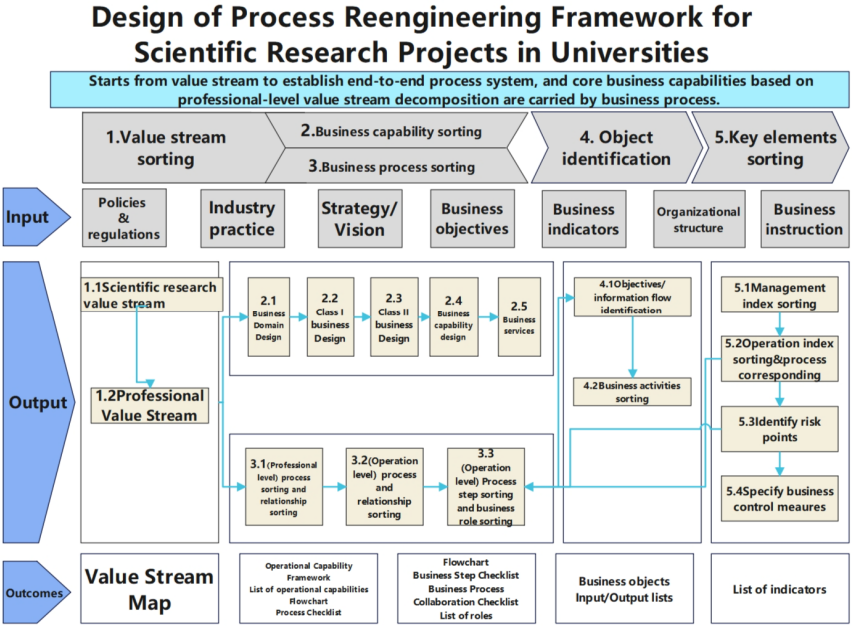

Fig. 3. Architecture design of university scientific research project process reengineering

3.3 Stage 3: Develop Process

Step 5: Design the process activities of university scientific research projects. Process activities are the basic units of a process, a set of interrelated tasks with defined outcomes and outputs. Process activity design should follow the following principles: First, there must be a specific business value. An activity should have a specific value. If the business value of the two activities is exactly the same, a merger may be considered. Second, there must be a single responsibility role. An activity can have multiple coordination roles, but the responsibility role should be single. Third, there must be clear control measures. For the problems and risks in the status quo analysis, corresponding control and assurance activities shall be designed, and the control types of activities (technical review, business decision, IT control, etc.) shall be clarified. Fourth,There must be stable and clear input/output. The output of the previous activity should provide stable and unambiguous input to the next activity. 5. There must be complete operation rules. Used to constrain the execution of an activity. 6. There must

be a clear way of implementing activities. Whether it is manual offline execution or automatic system execution, the execution mode of the activity shall be specified in the activity manual. In the process activity design, attention should be paid to unifying the granularity of activity design. This paper introduces the design and granularity of the general review activity, taking the general review activity of university procurement management department to the procurement demand submitted by the procurement demander as an example. As shown in the following table 1.

Table 1. Sample table of process activity

Activity Code	Acitvity	Role	Content of Activity	Input	Output
080	General Review	Head of Procurement Management	1. The general review mainly examines whether the procurement demander prepares procurement requirements in accordance with the procedures, contents and requirements specified in Article XX of the Measures for the Management of Material and Service Procurement Requirements of XX Colleges and Universities. 2. After the completion of procurement demand matching, if the procurement demand side really needs to adjust the procurement demand, when the budget amount or quantity scale changes by more than 10%, or the substantive content such as key technical parameters is adjusted and changed, the procurement management department shall re-organize the review. 3. For the phased procurement implementation of complex information systems, the procurement management department shall review the outline requirements and phased procurement implementation plan. 4. The general review shall be completed within five working days from the date of submission of the procurement request. 5. For specific operation steps and time limit requirements, please refer to the Procurement Requirements Preparation Guide.	1.Detailed procurement requirements after improvement 2.Implementation plan of procurement by stages to be reviewed 3.Procurement documents prepared by the procurement demander to be reviewed	1.Procurement Requirements Review Form, 2.Progress Registration Card of Procurement Project Implementation

Step 6: Design roles for university scientific research projects in business process. A role is a defined standard executor, related to the business, responsible for the execution and output of process activities, and can be matched with a position/position.

Basic requirements for role design and management: firstly, roles shall be unique within the business scope and match with common roles in the industry as far as possible; secondly, roles shall have clear responsibilities and skill requirements according to the requirements of activities performed in the process; thirdly, matching relationship between roles and positions/positions shall be clarified as far as possible during process design; some executor roles are only occupied by a single position or position, and it is recommended to use position/position names; Fourth, the role name is usually "A + B", where A represents the business trait and B represents the actor: for example,"project approval (A) clerk (B)" and "process (A) manager (B)". This role not only reflects the main activities of the role, but also can be limited to specific businesses.

Step 7: Design the input and output of university scientific research projects. Input and output refer to objects generated or circulated in business activities. As regards to input and output design, the information (such as fields of forms), form and content requirements must be specified. Input/output objects of each business activity in the process, including tables, certificates, documents and manuals that bearing data. Each activity should have an input and output information flow, and the information flow between activities should be correctly identified to ensure that information does not break the chain. Information flows input from front-end processes or other processes shall be directly referenced, and only the processing requirements for this information flow shall be described in the activity description. If a process activity reads or updates data from an incoming information flow and needs to add new data attributes that change the basic attributes of the information flow, a new information flow needs to be recreated. If the information flow is imported from outside (supplier/user, etc.), it is also created as a new information flow. Input and output information flows should be identified and designed synchronously during process design, and information flows newly created in this process and imported from outside should be clarified.

Step 8: Design process key control points of university scientific research project. Key Control Point (KCP) is an item or series of activities determined by the process owner in the business process to reduce significant risks, control uncertain factors with certain rules, and achieve related process objectives. To design the key control points of university scientific research project process, one is to identify the key control points, including: 1. analyzing the risks of main process activities;2. identifying the process control points;3. identifying the key control points. The second is to design key control points, including: 1. Review process objectives/boundaries and control objectives;2. Review actual process activities and existing process documents and comply with actual occurrence principles;3. Reach agreement with process owner/business representative to control the integrity and effectiveness of activities. According to the relevant business risks of scientific research project management in colleges and universities, overall planning of internal control, compliance, law, audit, discipline inspection and supervision requirements, through key control point design, the supervision built-in process will be explicitly transformed into activities, creating a full-service supervision embedded method, and incorporated into the Business Process Design Specification. The KCP shall be identified in the flowchart and process documentation and shall be listed in the process activity description.

Step 9: Design performance indicators of university scientific research project process. Process performance indicators are key performance measurement indicators of business operations. Calculation formula, measurement unit and statistical period should be clearly defined when defining, and measurement data can be obtained to measure the efficiency and effectiveness of business operations. In the process construction phase, process performance indicator design is the process of strategy decoding, which decomposes strategy into various levels of processes by connecting business strategic objectives and process operations. Process performance indicators monitor business strategy, achievement, and continuous optimization and improvement during the process operation phase. Process performance indicators can be divided into multiple attributes, such as cycle (speed and efficiency of process execution), cost (cost indicator of process execution cost), quality (quality indicator of process output), etc.

Taking the "rejection rate" performance index of procurement sub-process design in university scientific research project procurement process as an example, the content of process performance index is explained as table 2:

Table 2. Sample table of process performance indicators

Indicator	Rejection rate
Purpose	Improve the quality and efficiency of bidding procurement
Definition	Bid rejection during the procurement phase
Calculation Formula	Rate of rejected bids = Number of rejected bids in procurement phase÷Total number of procurement projects
Description	Standard rejection rate is one of the indicators to assess the performance of procurement management department in implementing procurement process. Setting this process performance indicator is conducive to improving the depth of demand demonstration and the business ability of procurement management department, reducing the expenditure and time loss caused by standard rejection, and improving the quality and efficiency of procurement work. Where the depth of demand demonstration cannot meet the procurement implementation conditions, or the supplier raises many questions and complaints, or repeatedly rejects the bid, the in-depth demonstration shall be reorganized.

Step 10: Develop the process manual of universtiy scientific research projects. Process manual shall include process description, specifications and standard basis followed by the process, work template and approval checklist.

A process specification is a document defining the basic elements of a process, describing the activities that must be performed and the requirements that must be followed in the process. The process specification shall describe in detail the process structure positioning, roles, activities, inputs and outputs, process performance indicators, corresponding rules and regulations, templates, instructions, etc., so as to ensure that even new employees can carry out their work through the process specification.

The norms and standards followed by the process refer to the laws, norms and other institutional documents followed when designing the process. Process design can not be separated from the management system norms, must be done to follow the system, in order to make the process can be substantive operation. The specification and standard basis followed by each activity shall be specified in the process specification, and the

specification and standard basis followed by each activity shall be accurately positioned to the article or page of the specific specification document, so as to reduce the times and time for staff to repeatedly check the whole specification document and improve work efficiency.

Template is a predefined format file to be filled in. Data input and output by process activities and those from tables, certificates, documents and books shall be standardized according to the accumulation of practical experience, so as to facilitate the use for staff and process-building in IT system.

Approval Checklist is a template tool with a wide range of uses. It is specially used by department leaders who need approval activities to check the quality of output parts or business process inspection and evaluation. The examination and approval checklist is a checklist summarized according to specific examination and approval items, normative documents such as laws and regulations and business practice experience.

Step 11: Integrate and verify the business process of university scientific research projects. In order to realize the end-to-end connection of process and data, real cases and typical scenarios of university scientific research project construction management business are selected, and the feasibility of process is verified through case integration under the joint deduction of process designer and process role business backbone. Adapt processes that cannot be realized at this stage, to the extent that stakeholders such as process designers, business managers, business staffs, data managers, and IT staffs are able to reach an agreement. Select typical scenarios, and verify business processes through integrated deduction, identification and definition of process that need integration and collaboration, so as to promote business collaboration and end-to-end efficiency.

Step 12: Publish the business process of university scientific research projects. After the process development is completed, it shall be issued by the authoritative department and implemented accordingly. Before the process is released, the process management system shall be clarified and a systematic management mode shall be established. The process management shall implement the process to the specific responsible person to ensure timely maintenance during the process re-operation, and optimize and track the process in time according to the efficiency of process operation. The responsible person of each process can organize relevant personnel to carry out training before release to explain and publicize the new process.

4 COLLABORATIVE GOVERNANCE MODEL OF UNIVERSITY SCIENTIFIC RESEARCH PROJECTS BASED ON PROCESS REENGINEERING

Based on the theory and method of university scientific research project process reengineering, this paper discusses the new mode of university scientific research project collaborative governance from three dimensions: collaborative entity, collaborative system and collaborative capability.

4.1 Collaboration Entity

Positioning of Collaborative Entities in Process. The reengineered and optimized university scientific research project process takes value creation and scientific research goal as the core, clarifies the post responsibility, function boundary and collaborative relationship among each collaborative subject, and displays the collaborative relationship through clear workflow. In addition, the main body of governance is fully included from vertical and horizontal directions, including leaders at all levels as well as specific office personnel, including internal roles of units and external cooperation units, and coordinating the cooperation and division of labor of each main body of governance on a unified process structure. The optimization and reengineering of the process is developed under the overall planning of the superior leading department and the joint participation of all collaborative subjects. All scientific research project governance subjects must fully consider the possible collaborative key points, sort out and identify the links in the process that need multilateral agreement and restriction.

Process-Based Collaborative Governance Organization Form. Process creates a management mode based on business process. Process-based organization combines the advantages of bureaucracy and flat organization. In order to improve the quality and effectiveness of scientific research projects in colleges and universities, the process-based organization does not disrupt and reorganize the existing organizational structure, but conforms to the current bureaucratic organization based on functional division. On this basis, the process framework is created, which is convenient for the system rules and unified leadership. The principle is carried into the process to realize the unification of power and responsibility of vertical hierarchical management and the requirement of administrative efficiency. At the same time, it focuses on core value creation, breaks through horizontal barriers of various departments and interfaces of external cooperation units, reduces business loss within departments under the traction of business flow, unifies information input and output channels of single departments, reduces some value-less creation links within departments, enables workflow to smoothly transfer from specific roles of one department to specific roles of another department, runs in a flat mode, solves cross-department coordination problems, and reduces information loss. Facilitate the smooth flow of information throughout the organization.

4.2 Collaboration System

Explicit Bearer of System Control. The process of scientific research project is a set of rules and mechanisms formed by the organization in order to realize value creation and organizational goals under the specific environment and resource guarantee. It is not only a systematic summary of good experience and practice, but also a bearer of system control. Therefore, university scientific research project process can provide institutional framework for collaborative governance of university scientific research projects.

Promote Collaborative Management from Rule by Man to Rule by Law. The reengineering and optimization of university scientific research project process does not go beyond the current university scientific research project management system, but on the basis of systematically sorting out all relevant rules and regulations, the article-type rules and regulations are revealed and embedded into the actual work process. Huawei, who has completed its digital transformation successfully, emphasizes that the system is the requirement, the process is the method, the system guides the process, and the process carries the system[19]. As Ren Zhengfei said: "A stable professional team and process system is like having two solid Volga banks. No matter how turbulent the waves inside are, the company can operate stably and efficiently". "We don't lead this company by people; we fight uncertainty of outcomes with certainty of rules"[20]. The system is explicit in the process, and then the process is carried on the IT system, which promotes the digital transformation of management and also promotes the transformation of collaborative management from rule by man to rule by law.

Institutionalization of KCPs. Set up process compliance assessment, process performance assessment and other assessment indicators. Managers improve the initiative and enthusiasm of collaboration entities through process assessment, and promote effective collaboration among collaboration entities according to processes. Set key control points in the process, identify and control collaborative risks, explain the key points and details of collaborative activities in detail, and solve the difficult problems of collaboration.

Update the Management System and Business Process. The process is not static, it is a fruit of best practices, it should be a rapid response to external changes, and therefore it will evolve quickly with the development of practice. Process managers need to update the process due to changes in external environment and collaborative problems, so as to promote the renewal and optimization of university scientific research project business and management system.

4.3 Collaborative Capability

Enhance overall collaborative capability with Process Reengineering Based Knowledge Management. In the practice of university scientific research project construction, due to the wide range of participants, large mobility, and part of the project management work undertaken by temporary posts such as scientific research secretary, etc., it is easy to appear insufficient collaborative skills. During the project construction, the staff cannot have a clear and complete understanding of the overall picture of the project, and they cannot start when they encounter coordination difficulties and blocking points. They need to ask for instructions repeatedly, read information and consult laws and regulations, resulting in delay in project construction. Leaders face similar coordination problems when faced with unexpected situations or conflicts, resulting in an inability to make quick and decisive decisions. The reengi-

neered and optimized scientific research project flow of colleges and universities shows the whole picture of project construction in the form of flow lane diagram, specifies the input and output form and completion time limit of activities, standardizes the end-to-end collaborative working mode, so that any role participating in project collaboration can find its own clear responsibility orientation and interaction relationship with other roles, and clearly find the corresponding responsible person and processing flow when the project is blocked. At the same time, the requirements and specific methods of each activity are described in detail in the process description document, and the input and output standardized template of the activity is equipped, so that even the personnel participating in the project work for the first time can quickly put into work under the guidance of the process description document.

Promote collaborative technology by Process Reengineering Based Data Management. After the process reengineering and optimization of university scientific research projects, it is necessary to establish the continuous process data on a unified IT system, and put the data into the lake according to the whole life cycle management of the project, and each collaborative entity calls unified data resources according to needs. On the basis of full coverage of business processes, a unified data base will help reduce collaboration costs, solve the problems of asymmetric information and unsmooth information interaction among subjects, and provide support for the improvement of collaborative capabilities. As shown in the following figure 4.

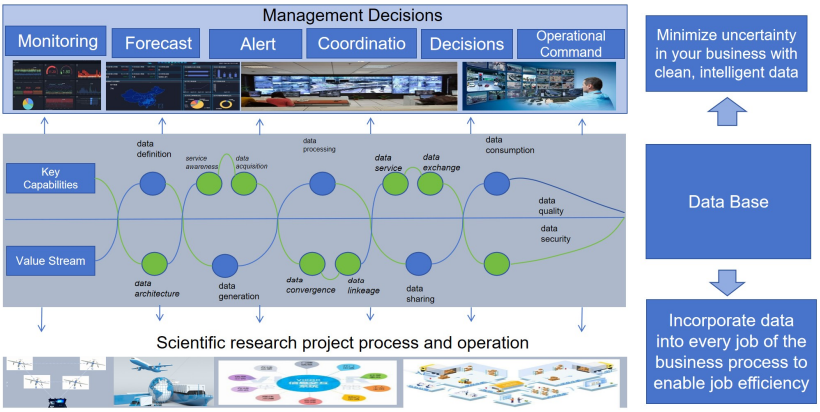

Fig. 4. Business process-based data management

Enhance Collaborative Willingness by Process Reengineering Based Performance Assessment. Through reward and punishment measures such as process performance assessment, university scientific research project process can unify the goal differences among collaborative entities, improve the collaborative willingness of each entity and the collaborative utilization rate of resources, create a good collaborative culture, and improve the overall collaborative capability of the organization.

5 CONCLUSION

The collaborative governance mode of university scientific research projects based on process reengineering is a reform of traditional scientific research project management concept, and also a practical exploration of organizational digital transformation, undertaking the strategic planning of scientific research projects in colleges and universities to the implementation of scientific research projects. Guiding by the demand of university reform, strategic planning and vision, aiming at the problems existing in the current scientific research project work of colleges and universities, such as unclear role orientation, separation of organizational functions, unequal distribution of rights and responsibilities, relative lag of collaborative management and knowledge management, lack of process management, etc., the overall structure of scientific research project work is systematically constructed against the industry benchmark. Business process of scientific research project based on process architecture, which bears the collaborative system in an explicit way, is a great achievement of excellent practices, and helps realizing knowledge management among organizations. It will serve the front-line scientific researchers to improve the management level and work performance through the construction of data architecture, technology architecture and application architecture based on reengineered and optimized business process, as well as the collaborative mode, collaborative technology and data resources.

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