



# Research on Risk Oriented Digital Audit Path of Scientific Research Projects

Yangpeng Zhu(✉)

School of Economic and Management, Xi'an Shiyou University, Xi'an, China  
22642999@qq.com

**Abstract.** In order to strengthen the audit supervision of scientific research project management, resolve the organizational planning difficulties faced in scientific research project audit, improve the audit coverage and accuracy of audit implementation, establish scientific, unified and standardized audit workflow and standards, and create higher audit value. This paper is risk oriented, starts with the whole process of scientific research project audit. It firstly establishes a matrix audit model, closely focuses on the high-risk areas and key management links of various business flows involved in scientific research projects, accurately benchmarks. Then, it completes the exploration of the digital audit path of the whole process of scientific research projects, forms a standard operating process, completes the project tasks. Finally, it finds problems and puts forward suggestions, which is of great significance to improving the risk prevention and control and self construction ability of scientific research projects. It plays a good role in promoting independent research and development capability. Through practice and timeliness management requirements, this paper enlightens the thinking of risk oriented agile audit mode for scientific research projects. It has a good reference value for relevant aviation manufacturing enterprises to carry out scientific research project management audit or self construction.

**Keywords:** Scientific research project · digital audit path · risk early warning

## 1 Introduction

Scientific research project is the main core business of an enterprise, involving a number of business processes. Each process is an independent business process, involving a large number of expense categories. The complexity of conducting scientific research project audit is far more than that of general audit projects. In order to better complete the project, it is necessary to innovate from the aspects of audit organization, audit content, audit skills, etc. The traditional audit of scientific research projects is to start from the scientific research expenses, focusing on error checking and leakage prevention, and carry out account audit; Risk oriented audit is to determine the nature, time and scope of substantive tests through quantitative analysis of inherent risks and control risks [1]. By analyzing the risk points and key internal control points in the business flow, comprehensively considering the problems found in the early audit, carry out substantive

tests to find the weaknesses of internal control; The two audit methods consider different contents and purposes, and their implementation paths are also different. Risk oriented audit is the place where major fraud is found on the basis of internal control [2].

Risk oriented scientific research project audit can help to pay close attention to high-risk areas, adjust audit strategies and determine audit priorities according to risk assessment results, reasonably allocate limited audit resources, accurately reveal potential risks, and put forward reasonable audit recommendations based on this, so as to promote the organization to add value. Strengthen internal control at risk points, promote scientific research projects to focus on objectives in business promotion, self construction and self adaptation, promote the continuous improvement of scientific research project management, and complete scientific research tasks in time [3]. The main contents of scientific research project audit include project funds and project management. Project management activities are the main line, and project funds are the economic conclusions generated by project management activities. From the traditional audit around the generation of the eight major expenses of scientific research project management to the audit of the whole business flow that generates the eight major expenses, this has higher value for the analysis of audit causes and the traceability of problems [4].

## 2 Related Works

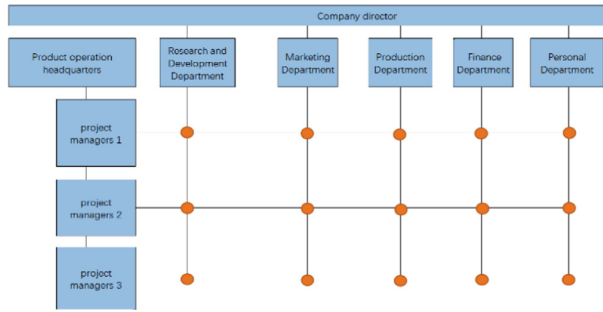
### 2.1 Digital Transformation

Since 2017, China has written the “digital economy” into the government work report for four consecutive years, and proposed in the 14th five year plan that “digital transformation as a whole drives the transformation of production mode, lifestyle and governance mode”, and digital transformation has been upgraded from an enterprise level to a national strategy. With the deepening of digitalization, the company will also empower the whole business domain through digital transformation [5].

Digital transformation is a kind of productivity transformation for the current enterprises to adapt to the digital economy era. It is a process to accelerate business upgrading and innovation transformation, transform and enhance traditional functions, and create and obtain new value. Digital transformation involves all aspects of the organization, and requires a strong governance mechanism and the functions of decision-making, coordination and support in the process of digital transformation. Digital transformation is actually a business transformation [6]. It is a core force that makes digital technology an enabling mode innovation and business breakthrough. For the audit business, the basis of the audited object is data, the fundamental task is business transformation and reconstruction, the means of realization is digital audit skills, and the core path is digital audit paradigm [7].

### 2.2 Matrix Organizational Structure

As shown in Fig. 1, Matrix organizational structure is a very common organizational structure. The organizational structure form is to add a horizontal leadership system on the basis of the straight-line functional vertical organizational system. It is composed of



**Fig. 1.** Matrix organizational structure



**Fig. 2.** Overall process of trial production of scientific research projects

a series of functional departments and a series of project teams formed to complete a temporary task, so as to realize the organizational structure form with the characteristics of business division and functional organizational structure at the same time. At the same time, it has the characteristics of division type and functional organization structure, and has the advantages of functional and product type (project type) function division. It strengthens horizontal contact, makes full use of professional equipment and personnel, realizes the flexible sharing of human resources, has greater mobility, and promotes mutual help and inspiration [8].

### 3 Audit Process Analysis

The audit process analysis mainly analyzes the scientific research project audit from six aspects: the scientific research project management process, the project financial management and accounting, the scientific research project management domain and content analysis, the key risk point analysis, the scientific research project basis and audit points, and the on-site implementation mode of digital audit.

#### 3.1 Scientific Research Project Management Process

As shown in Fig. 2, The trial production procedure of scientific research projects is mainly divided into six stages, namely project initiation, project planning, trial production preparation, product trial production, status identification and project closure.

#### 3.2 Project Financial Management and Accounting

The scientific research funds of the company are earmarked for special purposes, and the subject of “special payables” is set up to collect and calculate the scientific research

funds. The received appropriations and collected research and development funds are included in the “special payables” according to the scientific research projects. The cost of scientific research products is accounted by the parallel carry forward method. The direct expenses are directly included in the product cost, and the indirect expenses are included in the product cost according to the distribution of completion hours. At the end of each month, the product cost shall be transferred to “special accounts payable” for accounting. Scientific research expenditure is divided into eight major expenses, including material expenses, special expenses, outsourcing expenses, fuel and power expenses, transaction expenses, depreciation of fixed assets, management expenses, wages and labor costs. Among the eight expenses, material expenses, outsourcing expenses and special expenses account for a large proportion.

### **3.3 Management Domain and Content Analysis of Scientific Research Projects**

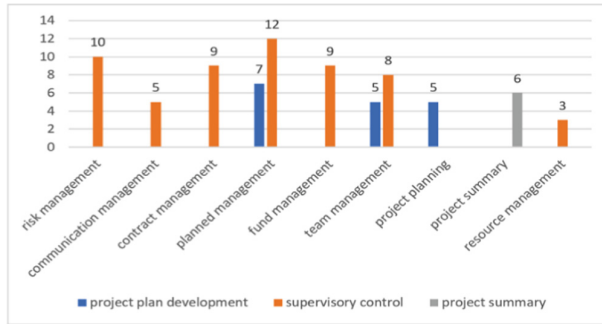
The scientific research funds of the company are earmarked for special purposes, and the subject of “special payables” is set up to collect and calculate the scientific research funds. The received appropriations and collected research and development funds are included in the “special payables” according to the scientific research projects. The cost of scientific research products is accounted by the parallel carry forward method. The direct expenses are directly included in the product cost, and the indirect expenses are included in the product cost according to the distribution of completion hours. At the end of each month, the product cost shall be transferred to “special accounts payable” for accounting. Scientific research expenditure is divided into eight major expenses, including material expenses, special expenses, outsourcing expenses, fuel and power expenses, transaction expenses, depreciation of fixed assets, management expenses, wages and labor costs. Among the eight major expenses, the top three are material expenses accounting for 48.29%, outsourcing expenses 15.20%, and special expenses 14.35%.

### **3.4 Identification of Key Risk Points**

The main risk points of the company’s scientific research project management business were identified. As shown in Fig. 3, A total of 79 project management risks were identified, including 17 main risk points for project plan formulation, 56 project implementation and monitoring, and 6 project summaries. In the promotion of the business sub process, it is divided into 9 business areas. Risks in risk management, communication management, contract management, plan management, fund management, team management, project planning, project summary and resource management run through the project management business sub process. For example, in terms of plan management, a total of 19 risks were identified, of which 7 were distributed in the project plan formulation stage and 12 in the project implementation and monitoring stage.

### **3.5 Key Points of Scientific Research Project Audit**

We should not only pay attention to the management and accounting of scientific research funds, but also tap the management problems behind them. Key audit contents include:



**Fig. 3.** Distribution of risks in business areas related to project management at various stages of project promotion

basic information of the project; Construction of scientific research project management system and process; The construction of relevant systems and internal controls for fund management and accounting of scientific research projects;

The management of project funds, including whether the budget management of funds has played a practical role, whether it is divorced from the project management, whether the appropriation and use of funds are in compliance, whether the safety of special funds can be guaranteed, whether there is misappropriation of funds, whether there are fund risks, etc.; The accounting and management of project costs, including whether the direct costs are disbursed in accordance with the regulations, whether the definition and allocation of indirect costs are scientific and reasonable, whether the income accrual is in accordance with the regulations, and whether the scope of project costs is expanded or the project costs are occupied; The deficiencies in the system and mechanism of the project, the bottleneck problems in the process of project management and implementation, and the deep-seated reasons behind the problems.

### 3.6 On Site Implementation of Digital Audit

When carrying out full data audit, we should actively focus on data. Under the big data environment, the working ideas and processes of full data audit mainly include six steps: business process analysis, audit points and basis, key risk point analysis, important form data structure, audit doubt search path, and audit question verification.

Sort out the business process of the audited business. For simple audit projects, the whole process from business concept to planning, implementation, inspection and assessment is sorted out. However, for large complex audit projects, multiple business processes may be involved. At this time, matrix analysis method should be adopted to promote the audit work in each independent business flow according to the five stages of audit plan, pre audit preparation, on-site audit, audit report and follow-up audit, and take the full business flow data as the audit basis.

Analyze the control points in the business process to form risk points and establish a risk base. In combination with the management requirements of the group and the company to promote reform through cases, the management requirements of patrol

inspection, the problems found in previous years' audit, the frequent occurrence points of internal control defects, etc., a problem base is formed.

Conduct data source analysis and pay attention to electronic data sources and paper data sources. The electronic data source mainly queries the business information system based on different business flows. Such as ERP information system, production management system MES, procurement management information system, contract management system, etc., laying the foundation for data collection. Paper data sources are mainly distributed in the current management systems and business processes issued by various business departments of the company, such as scientific research project department, material support department, production headquarters, operation support department, etc.

Data structure of important forms in the whole life cycle of scientific research projects. Combined with the risk points in the life cycle of the scientific research project, sort out the important links and important form data structures in the whole process of each independent business, and master the logical progressive relationship, digital reasoning relationship and possible mutual verification relationship between the data fields through the analysis of the data structures of each link.

Search path for doubtful points in scientific research project management audit. Through data collection, analysis and practice, the audit doubt retrieval method of business flow is summarized, and the audit doubt search path is formed. The relatively fixed search path for audit doubtful points is of great help to help auditors get familiar with the audit environment as soon as possible and quickly find audit problems. Similar to the digital twin technology, the mature audit doubt search path is the audit implementation method that auditors can copy.

## **4 Audit Effectiveness**

Through data analysis and verification methods such as digital analysis, personnel interview, audit investigation, walkthrough test, verification method, consulting method, causal analysis, multi-function linkage, etc., the project practice of scientific research project management audit has been completed, problems have been found and improvement suggestions have been put forward.

### **4.1 Risk Oriented Internal Audit Model Highlights Its Advantage**

On the one hand, it has positioned itself on the audit value-added goal, explored risk oriented internal audit, provided forward-looking and high-value risk consulting services for the management, promoted synergy, doubled the audit results, and highlighted management and economic benefits. On the other hand, the risk oriented internal audit mode improves the risk information in many key business areas of the company, and enables the company's managers to focus on and timely grasp the various risks faced by the company in the operation process. Audit promotes the construction of internal control and risk prevention of business, and forms the self-improvement and self-improvement function of business. Audit promotes the healthy and sustainable development of enterprises in the process of value creation.

## 4.2 Problems Found

Due to the particularity of scientific research project management, some problems are inconvenient to be disclosed, and only some typical problems are listed. In terms of plan management, the development and production progress lags behind; Delay in delivery of supporting equipment is common; Plan preparation basis is non-conforming; Lack of supervision, inspection and assessment of scientific research plan; The annual outsourcing plan is not accurate enough. In terms of contract management, there is a phenomenon of reverse signing of contracts; The contract review process is not standardized, and the review data has no review date; In terms of procurement management, the selection of suppliers does not reflect effective competition, the allocation standard of procurement share is not clear in the double flow procurement, and there is a phenomenon of non lowest price bid winning; There are nonconforming products in the raw material qualification warehouse; In terms of cost, the project funds are listed in series. Some contents of risk disclosure, for example, some measures of special measures conflict with the company's contract management system; No budget approval, incomplete data storage, overstocked materials, etc.

## 4.3 Management Recommendations

Strengthen the overall planning of scientific research projects, analyze the processes of the whole business domain, constantly improve the important risk points and key control points, implement policies accurately, gradually form a self construction and self-improvement system for scientific research projects, and improve basic management. Strictly manage the plan, ensure that the plan basis is sufficient, make overall arrangements for the annual plan of outsourced parts, strengthen plan control, coordination and communication during the development process, analyze the delay, formulate corresponding solutions, and strictly supervise and inspect the plan. Strengthen procurement management, strengthen collaboration between relevant departments, do a good job in plan management, and implement procurement business in strict accordance with the requirements of the company's procurement and contract management systems. Strengthen the production organization and resource balance of scientific research projects, reasonably arrange and carefully organize to ensure that scientific research products are delivered on time. Strengthen supplier management, improve the date of price inquiry and comparison in the supplier evaluation form, and each evaluation committee will score independently according to the evaluation criteria; When preparing the forms related to the price inquiry and comparison process, avoid inconsistent terms, especially the terms that will affect the bid evaluation results should be uncontested. Strengthen the whole process management of contracts, improve the management of contract signing process, contract signing, approval, supervision and other process management, put an end to reverse signing or supplementary signing of contracts, conduct regular contract evaluation and correct deviations in time. Control the input of resources, strengthen inventory check, balance of various assets when the input exceeds the contract plan, and formulate disposal measures in time.

## 5 Conclusion

This paper is risk oriented, starts with the whole process of scientific research project audit, establishes a matrix audit model, closely focuses on the high-risk areas and key management links of various business flows involved in scientific research projects, accurately benchmarks, completes the exploration of the digital audit path of the whole process of scientific research projects, forms a standard operating process, completes the project tasks, finds problems and puts forward suggestions, which is of great significance to improving the risk prevention and control and self construction ability of scientific research projects, It plays a good role in promoting independent research capability.

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