

Research on the Commercialization Model of Technological Projects with Multi-party Investment

Ying Xiao ^{1, a}, Dundun Wang ^{1, b}, and Guoli Hu ^{1, c}

¹ State Grid Hunan Electric Power Company Limited Electric Power Research Institute Changsha, China.

^a 451741940@qq.com, ^b wdd.daniel@outlook.com, ^c huguoli105@163.com

Abstract. Technology projects, serving as a vital carrier for innovation, act as a bridge for the amalgamation and intercommunication of technology, talent, and innovative elements, and are pivotal for achieving "high-level self-reliance and strengthening in technology." To address the loss of corporate intellectual property and discursive power in the marketization and commercialization of technology projects due to inadequate theoretical support and an unsound protection mechanism, State Grid Hunan Company has initiated research on the commercialization model of technology projects against the backdrop of multi-party investment. By exploring the multi-party investment and cooperative operation model of technology projects based on the "Innovation and Efficiency Community" within power grid enterprises, the study aims to establish a cooperative mechanism for technology projects that involves multi-party participation, collaborative assistance, risk-sharing, and benefit-sharing. This not only strengthens self-protection during the commercialization process but also propels the cooperative technology projects towards a path of greater openness and sharing.

Keywords: commercialization; electric power system; multi-party investment; technology projects.

1. Introduction

A scientific and systematic technology project management system, along with a rich and comprehensive technology project management regime, plays a crucial role in developing original technologies, cultivating innovative talents, and stimulating innovative vitality [1-3]. At present, while State Grid Hunan Company has established a complete management system for the projectization and result-oriented aspects of technology projects, it has not developed mature theoretical support or introduced systematic protection mechanisms in terms of marketization and commercialization. This deficiency has led to the loss of discursive and dominant power in the marketization and commercialization implementation process of technology projects, and even to the loss of intellectual property and economic benefits, posing a severe issue [4-5]. Such a situation not only inflicts significant damage on the company's technological self-reliance but also deals a heavy blow to the innovative enthusiasm of all employees. Therefore, researching the commercialization model of technology projects with multi-party investment becomes exceedingly necessary.

2. Exploring Investment Community under the Co-Creation of Value Theory

2.1 Value Sharing Theory and Research on Technology Project Investment

The theory of value co-creation originates from an individual-centric concept that emphasizes consumers and businesses co-creating value together [6-8]. Differing from the traditional concept—where businesses create value and then transfer it to consumers through exchange—value co-creation transforms consumers from passive purchasers into active participants in value creation, emphasizing their involvement in the research, design, and production processes of a business, thus co-creating product value and establishing a community of consumer interests together with businesses. Value co-creation bears significant meaning for both enterprises and consumers [9].

Technology project investment [10-11], an innovative investment activity involving multiple internal and external investment entities, is not only a complex process introducing resources and capital from various sources but also a cooperative community where multiple parties co-create value, aligning with the value co-creation theory. External aspects of technology project investment involve business processes like risk and benefit assessment, business negotiations, agreement signing, financial resource input, result transformation and promotion, and profit distribution, while internal aspects handle business processes like compliance review, financial management norms, and projectized management, all conforming to key impact elements of commercial value investment.

2.2 Establishing Commercialization Cooperative Mode for Power Grid Company's Technology Projects

Positioning as an "enterprise innovation entity", State Grid Hunan Company actively participates in the whole society's value creation, adhering to China's electric power technology self-reliance and strengthening. Grounding on the features of state-owned enterprises, characteristics of power grid enterprises, and traits of innovative companies, the company explores constructing a multi-party investment and cooperative operation model for power grid enterprises' technology projects based on the "Innovation and Efficiency Community". This aims to promote technology projects toward the path of openness, sharing, and innovation, stimulating innovative momentum, pooling innovative resources, driving innovative investment, and enhancing innovative output.

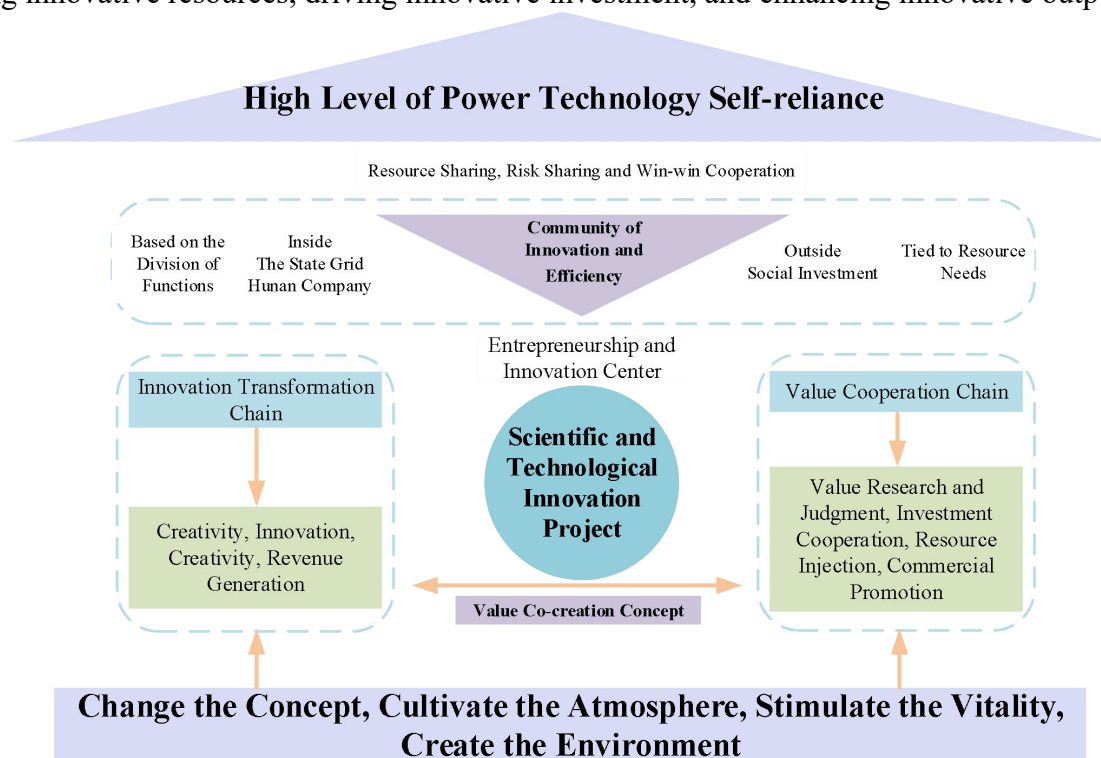


Fig.1. Commercial cooperation model based on "innovation and efficiency community"

3. Transformation of Technological Innovation in New Commercialization Cooperation Model

3.1 Breaking Through Systemic Constraints and Embracing Openness

State Grid Hunan Company has profoundly scrutinized the environment for scientific research and innovation, initiating a series of reforms in institutional mechanisms. This transformation focuses on four levels: the nation, Hunan Province, the energy industry, and the State Grid Corporation, encompassing 12 crucial directions such as project management, personnel

management, fund management, and revenue management. The company has compiled 22 systems and methods aimed at stimulating the vitality of scientific research and innovation, such as the "Hunan Province Key Policy Compilation for Winning the Battle of Scientific and Technological Innovation" and the "State Grid Corporation Medium and Long-term Incentive Management Measures". The core objective is to inspire vitality through institutional innovation and enhance efficiency through mechanism optimization, breaking the ossified self-enclosed environment of state-owned enterprises. Scientific research and innovation are transformed from a "closed enterprise internal cycle" to an "open internal and external dual circulation".

3.2 Advocating Cooperative Win-Win, Walking the Path of Sharing

The company encourages the main bodies of scientific research and innovation to achieve powerful alliances and has introduced the "541" mechanism. This refers to involving one external resource entity in the 4 stages of creativity, innovation, creation, and revenue generation for 5 types of commodifiable scientific research projects - hardware, software, platforms, patents, and standards. For instance, during the research project initiation stage, an investing entity from the industrial unit is involved; during the product trial production phase, the equipment manufacturer is involved; and during the sales revenue phase, the channel entity participates. This model propels joint research and development, bringing the necessary subject resources to scientific research projects and also accelerating the R&D process. Scientific research and innovation thus evolve from a "solo act" into a "grand chorus".

3.3 Scientific Research and Innovation: from "Product-Oriented" to "Product Commodity-Oriented"

The "Innovation and Effectiveness Community" model emphasizes the problem-solving ability and conversion revenue of scientific research results and uses the market to verify the comprehensive benefits of scientific research outcomes. This not only focuses on the extension of the technical chain but also emphasizes the realization of the value chain, not just watching over the development of products but also monitoring market performance, while also scrutinizing profit distribution. The concept of commodity value is integrated into the entire process of scientific research and innovation, guiding the transformation of scientific research and innovative results from the very beginning of project initiation. Scientific research and innovation extend from "focusing on technology" to "encompassing products", and then evolving into "integrating commodities".

4. Propelling the New Commercialization Cooperation Model Through "Through Four Supports"

4.1 Establishing Investment Foundations and Conducting Technological Project Value Assessment

Utilizing the "Strategic Technology Evaluation Model (STEP)" [12], assess the business potential and influencing factors of technological innovation outcomes at various developmental stages, involving aspects such as creativity, intellectual property, funds, market, technology, production, publicity, and promotion. The evaluation is categorized into six aspects: technology, process, economy, market, perception, and regulation/policy.

1) Technology evaluation: The fundamental technical attributes serve as the foundation for potentially successful applications. What interests in determining the commercial potential of science and technology innovation projects are the values of these technical attributes. This value may vary according to the level of patent or license protection for the technology.

2) Process Evaluation: Process evaluation involves the adoptability and adaptability of new technology in existing utilization methods, or the processes that the technology will replace.

Consideration should be given to whether the new process might be so-called disruptive technology, which is a kind of technology that changes the overall framework of the market, possibly completely eliminating other competitive technologies, or creating an entirely new technological field/network.

3) **Economic Evaluation:** The economic aspects of technology are completed through a review evaluation of the costs and benefits that will be generated by completing technological development and testing. Other considerations are the cost of implementing the technology and the cost of operation and maintenance.

4) **Market Evaluation:** The market aspect evaluation is based on the identification and evaluation of the market demand for the technology. It involves the iterative process of defining potential market niches for the technology and questioning the potential buyers or users of the product in that niche, to determine if there is potential demand for the technology.

5) **Perceptual Evaluation:** STEP deals with the end-users' feelings towards the technology and its potential to be utilized as an attractive product or technology as a perceptual evaluation.

6) **Regulatory Evaluation:** Not all industries and markets corresponding to all technologies are the same, as they vary due to the unique characteristics of the technology and the overlay of these characteristics in the physical and cultural aspects of potential locations for application. Furthermore, not every sector or location accepts a technology equally due to regulatory policies. In these instances, involving experts who identify and understand these specific factors in the evaluation process is of great significance for a holistic evaluation of the technology.

4.2 Facilitating Transaction Channels and Unblocking the Technology Achievement Trading Platform

State Grid Hunan Company actively implements the docking with the State Grid Company's Dual Innovation (Double Creation) online platform and the "E-commerce Transaction Special Zone", relying on the State Grid Hunan Company's Dual Innovation Center for market-oriented operations. This involves carrying out services such as demand and capability docking, experimental resource sharing, transformation method consultation, and innovation and entrepreneurship coaching. Simultaneously, based on the aggregation of innovative elements such as achievements, funds, talents, and services, it connects the e-commerce platform's technology innovation product special area. The company has researched and issued policy measures for the "e-commerce" transactions of State Grid Hunan Company's technological innovation achievements, realized the one-click order function for sci-tech innovation products, and promoted the market application of technological innovation achievements.

In addition, based on the STEP evaluation model that revolves around factors such as creativity, intellectual property, capital, market, technology, production, publicity, and promotion, divisions are made in technological innovation. State Grid Hunan Company formulates types of commercial cooperation agreement templates for technological projects in accordance with the "entry fee + commission fee pricing and payment method," "firstly negotiating pricing, secondly evaluating pricing, and thirdly listing trading methods on the open technology transaction market," and "milestone method or entry fee + commission fee method." This provides standard template support for technological project cooperation and reduces the risk of commercial negotiation and contract signing.

4.3 Upgrading the Research Environment and Elevating the Original Starting Point of Scientific and Technological Innovation

State Grid Hunan Company establishes a new type of scientific research management for power grid enterprises, termed "one dimension, two controls." "One dimension" refers to adapting to the needs of marketization, adjusting the research management philosophy of "indicator + benefit" and "product + commodity," and reshaping the pattern of scientific research and innovation. "Two controls" emphasize management and service, improve the scientific research project control

mechanism that covers result selection, plan formulation, operation control, industrialized implementation, and post-evaluation, and scientifically organize implementation. It also stresses autonomy and decentralization through mechanisms like the horse-racing system, lump-sum system, leaderboard leadership system, flexible team system, and fault tolerance system, thereby fostering an innovative atmosphere.

4.4 Upgrading the Research Environment and Elevating the Original Starting Point of Scientific and Technological Innovation

State Grid Hunan Company has issued "Implementation Opinions on Strengthening Scientific and Technological Innovation and Open Cooperation." Focusing on "three focuses"—focusing on practical problems in production and operation, focusing on the innovative vitality of scientific research talents, and focusing on the transformation of scientific and technological innovation achievements—it formulates specialized systems, such as intellectual property protection and personnel incentive policies for the heads of research activity teams and project leaders. These provide a more favorable development platform for talent to genuinely devote themselves to scientific research work by creating a better research environment at all levels. The issuance of management systems such as "Implementation Details for Scientific Research Fund Management" and "Implementation Details for the System of Technological Project Leaders" perfects the scientific and technological management system. The "Implementation Details for Pre-research Management" have been formulated, company pre-research special funds have been set up, and the exploration of establishing a scientific research pre-research mechanism has been initiated. The company has built the "Scientific and Technological Information Management Service System" and related application methods, providing informational management and services throughout the entire process of scientific and technological projects.

5. Conclusions

This research delves into the active exploration of the value co-creation theory in the investment of enterprise technological projects, technological innovation, and international cooperation, aiding in clarifying the demands and focal points of investors and fully accelerating interactive multi-party investments. The research approach of the project is clear and the innovative thinking is rational, not only providing reference value for power grid enterprises, electric power enterprises, and state-owned enterprises in investing in technological projects and introducing social capital but also offering robust support for propelling various societal sectors to actively participate in China's strategy for technological self-reliance and strengthening.

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