

Research on collaborative operation of diversified business for large energy enterprises

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Abstract: Achieving strategic synergy between diversified businesses is one of the important objectives of world-class enterprises, and relevant operational decision-making technology is a hot topic. At present, the world's leading enterprises, including large energy enterprises, are widely engaged in diversified operations, and continue to promote the synergy between the main business and financial business, international business, strategic emerging industries and other auxiliary businesses. In this paper, the existing achievements of enterprise diversification decision-making technology are summarized from the perspectives of basic theories and typical practices. Subsequently, after in-depth analysis of the major problems faced by energy enterprises in promoting the coordinated development of diversified businesses, a key element identification model for large energy enterprises is proposed to promote the coordinated development of diversified businesses, and in the meanwhile puts forward relevant suggestions on the important mechanism for energy enterprises to carry out the coordinated development of diversified businesses.

1. Introduction

The important reason for large enterprises to promote diversified development is to obtain the synergistic development effect among various businesses and ultimately form a virtuous circle of the whole enterprise. At the same time, there is a dynamic game relationship between competition and cooperation among businesses. This collaboration relationship is reflected in the collaboration between internal resources of the enterprise, such as the collaboration between departments, collaboration between different business indicators and objectives, and the collaboration of various resource constraints [1].

The domestically diversified business group has evolved, via market forces, to deal with complexities and challenges of its home market. Diversified business group affiliation may also positively influence unrelated acquisitions in foreign markets because of inter-business or inter-segment linkages within the group. Through diversification, a firm generates a variety of subunits of technology and business, and its evaluation system leads to firm selection among the diversified subunits and advancement of firm capabilities and strategies of technology and business that improve firm performance. In the meanwhile, from the evolutionary perspective, the firm that faces higher levels of business strategic similarity may recognize the need for variation of its business areas and for advances in its competencies across diversified business areas. Hence, it is expected that as the level of business strategic similarity increases,

the firm with the less diversified technological profile intensifies its business diversification.

Large energy enterprises are often diversified business groups. The collaborative management for large energy enterprises is to make full use of the respective advantages of each resource on the basis of maximizing the value of the whole system through the overall coordination of the relationship between the internal and external resources of the enterprise.

1.1. Theoretical basis for cooperative operation of diversified businesses

A few studies on diversified business have investigated the influences of interfirm competition on the firm's diversification. In the meanwhile, the extant studies on business diversification have mainly investigated intrafirm competition measured by business concentration ratios. In the article of "Diversification Strategy", American scholar Ansoff proposed that diversification is to create new products and occupy new markets. In 1959, Penrose E.T., a British economist, thought more deeply about diversification. He believed that diversification not only requires the development and production of new products, but also requires significant differences between new products and original products. Its essence is the extension of business scope. R. Rumelt, an American management scientist, pointed out in 1974 that the essence of diversification is to use various existing resources to develop new fields, and stressed the importance of cultivating new competitive advantages and consolidating the existing

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market position. Since then, academia and business have carried out extensive and in-depth research on the collaborative management from different perspectives of theory and practice [2-3]. Among them, academic research mainly includes the theory of competitive advantage, the theory of cluster economy, and the theory of division of labor and co-operation.

The first theory is the theory of competitive advantage. The economies of scale, economies of scope, highly specialized division of labor, and reduced transaction costs formed by enterprise enterprises can enhance the competitiveness of industries within the group and strengthen the competitive advantage of the group head-quarters. Unlike the simple summation of the competitiveness of enterprises within the group, the competitiveness of the group is strengthened by taking advantage of the overall synergy.

The second theory is the theory of agglomeration economy. The role of agglomeration can be divided into two forms, including the production agglomeration resulting from the expansion of business scale and the agglomeration resulting from the concentration of multiple enterprises in space [3]. Large-scale production agglomeration mainly comes from the pursuit of "large-scale operation interests" or "large-scale production interests", while the benefits of spatial agglomeration of multiple enterprises are brought by the cooperation, division of labor and common use of infrastructure among enterprises. The agglomeration of multiple industries of-ten saves more costs and gains more benefits than when they are dispersed.

The third theory is the theory of division of labor and cooperation. The biggest effect of enterprises is realized by the division of labor and cooperation among industries, which is a dynamic and continuous effect [4]. As an efficient form of organization, enterprises maximize the industrial correlation effect and cooperation effect, and form a coordinated development between enterprises.

The fourth theory is external economic theory. The economic scale of an enterprise depends not only on the scale of business development, but also on the internal economies of scale such as the resources, organization and management efficiency of various industries within the group.

Overall, the extant literature has investigated factors related to intrafirm or interfirm competition in either the diversified technological or diversified business domains in isolation. Despite previous studies showing contrasting implications in multiunit firms' diversification decisions depending on competitive forces, the factors related to interfirm competition at a micro level have been under-explored in the studies on the coevolutionary relationship between technological and business diversification

1.2. Typical practice of cooperative operation of diversified businesses

1.2.1 Huaneng Group

The first typical case is Huaneng Group. Huaneng Group stand out as diversified business groups founded and controlled by high profile Chinese entrepreneurs. Specifically, the firm's diversified technological profiles enable to find appropriate business fields to diversify, thereby reducing its searching costs and investment risks from expansion into new markets.

The core industries include coal power, hydropower, natural gas power generation, nuclear power, wind power, etc., and other diversified industries. Huaneng Group divides these six business sectors where its subsidiaries are located into three sectors: core business (power business), related business (shipping business, resource business) and other businesses (technology and financial services, public goods, and other industries). Huaneng Group focuses on building an industrial value chain with electric power as the core, and cooperates with upstream and downstream industries such as finance, shipping, ports, coal, etc. Based on the analysis of the external environment and its own advantages and disadvantages, a plan with clear strategic objectives and scientific development ideas has been formulated in order to strengthen capital operation and increase capital accumulation.

1.2.2 BP Group

The second typical case is BP Group. BP uses a typical matrix management organization to achieve business collaboration. The matrix includes two dimensions of region and industry, and combines the business division system and department system. In terms of industry dimension, BP has successively established 12 branches including BP International Petroleum, BP International Chemical and BP Petroleum Exploration, each of which is responsible for leading a special business area.

In terms of geographical dimension, BP has established a number of investment platform enterprises, such as BP Global Investment and BP Asia-Pacific Investment. Each subsidiary is not only under the centralized guidance of professional branches, but also under the coordination and supervision of regional investment platforms.

In 2022, BP achieved a net profit of US \$27.7 billion, an increase of 115.8% year on year, surpassing the US \$26.3 billion in 2008, setting the highest profit since the establishment of the company. Among them, the oil and natural gas business has made a relatively high contribution due to the increase in energy prices caused by the Russian-Uzbekistan conflict. However, the contribution of energy transformation business, the investment of which accounted for 30% of the total expenditure last year, was relatively low. In the long run, the energy transformation business will still be the business focus in the future. This reflects the important role of diversified business synergy in coordinating

uncertain risks and seeking long-term development balance.

1.2.3 Tokyo Electric Power Company

The third typical case is Tokyo Electric Power Company. Tokyo Electric Power Company believes that the power business is gradually changing from providing energy products to providing energy services, and will continue to change from single service to comprehensive service.

To this end, Tokyo Electric Power Company has actively adjusted its business strategy, established a new strategic positioning of comprehensive energy service providers, and built a "four in one" platform, including transmission and distribution platform, infrastructure platform, energy platform and data platform to fully support its comprehensive energy service business development. These four platforms have broken the traditional boundaries between the power system and other systems in the energy and other related systems outside the energy, and achieved effective coordination and flexible interaction between the internal and external energy. The firm's diversified technological resources facilitate its differentiation through business diversification, leading to financial performance increase [1, 3].

2. Problems faced by the coordinated development

2.1. The diversified business collaboration mode needs to be optimized

First of all, large energy enterprises generally pay more attention to the synergy between main business and auxiliary business, and the synergy among different auxiliary business. The commonly used contract entrustment method has the disadvantages of long negotiation cycle and poor coordination, which affects the extensive cooperation between auxiliary businesses [5].

Secondly, the coordination mode and mechanism between the auxiliary business and the primary business of large energy enterprises need to be further optimized. As the transformation of the energy business, businesses such as comprehensive energy services and electric vehicle services will usher in a "window period" of rapid development. Due to the unclear interface between the primary and secondary business units in the process of joint market expansion, it is not conducive to the cooperation between the primary units and limits the enthusiasm of cooperation.

2.2. The overall synergy of resources has not been brought into play

First of all, the basic resource sharing business of the main business of large energy enterprises is limited. Influenced by various factors, such as comprehensive energy services, electric vehicles and other new

businesses have a wide coverage and flexible forms, which can play an important role in the incremental distribution reform purchase agency [6-8].

Secondly, there are still barriers to the sharing and interoperability of data and talent elements in large energy enterprises. Inadequate incentives for data sharing, the long-term existence of data islands, and the enabling role of data elements on business and other elements have not been fully played.

2.3. The dynamic synergy evaluation system is not completed

First, the dynamic tracking and adjustment mechanism for the market-oriented business layout of large energy enterprises has not been established [9]. At present, enterprises generally have not established a complete performance monitoring, potential evaluation, and adjustment mechanism for subdivided businesses. When facing fierce market competition, some businesses may play a negative role in collaborative development due to competitive disadvantages. Through diversification, a firm generates a variety of subunits of technology and business, and its evaluation system leads to firm selection among the diversified subunits and advancement of firm capabilities and strategies of technology and business that improve firm performance [10].

Secondly, the closed-loop management mechanism of all factors of large energy enterprises has not been established. At present, the difficulties in the development of various factors are still unclear, and the improvement path is not clear. It is urgent to find out the identification methods of the weak links in the establishment of such factors including capital, talent, innovation, management and data.

3. Important mechanism for coordinated development

3.1. Business collaboration mechanism

At present, the company focuses on the energy business chain, covering key links such as research and development, manufacturing, auxiliary services (such as finance), effectively reducing the risk of external transactions. On the supply side, it is the specific ability of diversified business groups to internalize technologies, brands and know-how, shared internally within the diversified group, which increases their absorptive capacity of unrelated businesses.

On this basis, it is necessary to further analyze the internal industrial chain, identify the value flow, focus on the integration of business and finance, the integration of finance and business, the entry point of emerging business to traditional business, evaluate the value contribution of each link, eliminate the low value and low efficiency industrial chain links, and realize lean operation. At the same time, the system combs the core links of cross-business processes, forms a visual cross-

business flow chart, clarifies the responsibility subject, and avoids unclear responsibilities of cross-business collaboration.

3.2. Internal resource sharing mechanism

In view of the difficulty in coordination of stock resource sharing business, a cross-discipline coordination mechanism for resource sharing is established to solve key and difficult problems in a timely manner through on-site office work, thematic coordination, regular meetings, etc. At the enterprise level, special guidelines are formulated for key issues such as price setting and interface division of asset reuse, and guidance mechanisms are established to form cooperation norms with clear processes, clear rights and responsibilities, and reasonable prices in combination with practice.

Establish the shared resource management sharing mechanism, and the resource ownership unit and the trial unit shall jointly maintain and manage the shared resources. There will be lower levels of opaqueness, an important concern to overcome if the firm is affiliated to a diversified business group with operations in many different sectors in the emerging market. The need for competence improvement may lead the firm to utilize the less diversified technological profile and enhanced technological competencies.

Make full use of emerging digital means, such as big data technology, cloud computing, mobile internet technology, artificial intelligence technology, Internet of Things technology, blockchain technology and other new generation information and communication technologies, to build a data platform, human resource platform, scientific and technological innovation basic resource sharing platform, innovation and entrepreneurship platform, further optimize the functional positioning of capital operation center, big data center, talent evaluation center and other institutions, penetrate comprehensive utilization management of resources into professional management.

3.3. Talent flow mechanism

For tasks with collaborative and critical characteristics such as project development, emerging business, scientific research, etc., we will transfer talents across regions, units, departments and other sectors to form matrix teams or enterprises to carry out business research. In terms of operation mechanism, the head of the research team should be given full autonomy in employment.

With flexible employment, team members returned to their original units. To meet the needs of business integration and development, break the barrier of talent flow between businesses, scientifically set up composite posts, improve the evaluation and incentive system and talent training system for composite skilled talents, create a "one specialty and multiple abilities" composite talent team that runs through the grass-roots level, and

meet the challenges of transformation and upgrading of the energy business.

4. Conclusion

At present, the world's leading enterprises are widely engaged in diversified operations, but there are many constraints in the way of diversified business synergy, the overall synergy of resources, and the dynamic synergy evaluation system.

Combined with relevant theoretical and practical studies, this paper believes that the supporting factors for the coordinated development of large energy enterprises mainly include strategic planning coordination, human resources coordination, financial resources coordination, data resources coordination, material resources coordination, innovation resources coordination, service resources coordination, and brand resources coordination, and attaches importance to playing an important role in business coordination mechanism, internal resource sharing mechanism, and talent flow mechanism.

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