

# The Impact of Technology M&A on Corporate Innovation Performance---- Literature Review and Future Prospects

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**Abstract.** With the increasing role of technological innovation in economic development, technology mergers and acquisitions have become an important way for enterprises to carry out technological innovation. This paper analyzes the related literatures on the relationship between technology mergers and acquisitions and enterprise innovation at home and abroad, and summarizes the motivations of technology mergers and acquisitions, the positive and negative effects on enterprise innovation, and the main determinants.

**Keywords:** Mergers & Acquisitions; Corporate Innovation Performance; Literature Review.

## 1. Introduction

Innovation is not only the source of the competitive advantage of enterprises, but also the key to the promotion of value. It is also the core factor driving the economic growth of a country. How can companies that are the mainstay of innovation gain innovation capabilities? In today's highly competitive environment, sustainable technological innovation is a necessary condition for companies to survive and achieve steady growth. The rapid development of science and technology and the emergence of new technologies have made it necessary for enterprises to seek ways to acquire external technologies while conducting technological research and development in order to improve their technological innovation capabilities. Among the many ways of external technology acquisition, technology mergers and acquisitions have its outstanding advantages, and become an effective way for a large number of enterprises to acquire advanced technology and actively participate in international competition. The theory of technology mergers and acquisitions has been relatively mature, but the application of our country must take into account the special environment of our country. Technology mergers and acquisitions are in different environments and naturally have their own unique side.

## 2. Theoretical Analysis and Assumptions

### 2.1 Technology Merger

Considering the research of scholars at home and abroad, technology mergers and acquisitions are characterized by technology as the main motive for mergers and acquisitions. Technology mergers and acquisitions are defined as: small enterprises with technology as the main driving factor, for the purpose of upgrading or acquiring technical capabilities, for small and medium-sized technology enterprises M&A activities implemented [1].

### 2.2 Innovation Performance

Technological innovation performance refers to the innovative achievements of economic entities through the effective development and utilization of various resources on the basis of their own technological innovation capabilities. Therefore, we can define technological innovation performance as the comprehensive income obtained by the innovation subject after a certain amount of technological innovation input. In the process of research at home and abroad, most of the patent results or sales revenue of new products are used as indicators to measure the performance of technological innovation.

## **2.3 Motivation of Mergers and Acquisitions**

Jensen and Ruback pointed out the various sources of M&A performance, including efficiency theory, agency theory, market power theory, and arrogance hypothesis.

The traditional efficiency theory believes that mergers and acquisitions can improve the overall efficiency of enterprises, enhance the visibility of enterprises to a certain extent; shorten the construction period, rapidly expand the scale of enterprises, and obtain scale effects [2]; The motivation to pursue self-interest has driven the occurrence of M&A activities. When a business manager has a small share of ownership, managers are more likely to engage in low-return or even negative M&A activity than paying dividends to shareholders. Hao Qingmin, Ren Huanhuan pointed out that the main reason for M&A activities is often because of the ability to reduce competitors by mergers and acquisitions to enhance the control of the business environment, increase market share, enable enterprises to obtain some form of monopoly or oligopoly, and increase long-term Profit opportunities. Cassiman B shows that agency, arrogance and control market theory are the main drivers of mergers and acquisitions.

## **2.4 Technology M&A Mode**

The research on the mode of technology M&A focuses on the factors that influence the choice of technology M&A mode. In this respect, scholars at home and abroad have their own insights and there is no consensus. Cho studied the technology M&A selection model by comparing the respective influencing factors of internal R&D, R&D alliance and external technology mergers and acquisitions. Lei Wenxin divided corporate mergers and acquisitions into two categories based on the technical relevance of the main and the two sides - knowledge-complementary technology mergers and acquisitions and knowledge-replacement technology mergers and acquisitions. Wang Lijun combined the technology of M&A and its internal connection, and divided the technology acquisition into six modes according to the strategic intention of M&A technology. Wang Yuli divided the technology M&A model into enhanced, complementary and breakthrough technology mergers and acquisitions.

# **3. The Impact of Technology Mergers and Acquisitions on Corporate Innovation**

## **3.1 The Positive Impact of Technology Mergers and Acquisitions on Corporate Innovation**

Scholars who hold a positive view on the company believe that after the merger of technology, the knowledge of the main company and the company has been expanded, the knowledge complementarity between the two parties has been increased, and the existing knowledge of the company has been updated, avoiding the inertia and simplicity caused by the reuse of existing knowledge, achieving technical synergies, improving the economies of scale and scope of R&D, and thus promoting Enterprise innovation [3]. Empirically, many scholars' research provides evidence for this view. Aghion P, Tirole J found that 13,000 mergers and acquisitions in the United States between 1984 and 1997 found that mergers and acquisitions increased the number of patents and patent citations in the three-year window of the company, and for companies with weak innovation ability before mergers and acquisitions. More significant, Gong Yuhui based on China's 2010-2015 M&A behavior, the Shanghai and Shenzhen listed new energy auto industry in the four years of business performance changes empirical analysis, pointed out that the implementation of mergers and acquisitions will acquire technology and achieve technical synergy Effect, thereby enhancing its core competitiveness.

## **3.2 The Negative Impact of Technology Mergers and Acquisitions on Corporate Innovation**

The study of the negative impact of mergers and acquisitions on corporate innovation believes that after the occurrence of technology mergers and acquisitions, cultural differences, such as habits, values, expectations, personality, and other such different corporate cultures, will inevitably collide and cause friction [4]. Some scholars believe that because the main company cannot effectively

integrate with the target company, to release the synergy between the two, and even have a negative effect, leading to a reduction in innovation. Similarly, empirically, many scholars have provided evidence to support this argument; Hitt found that mergers and acquisitions have significant negative impact on R&D intensity and patent strength of enterprises based on mergers and acquisitions of 191 manufacturing companies in the United States from 1970 to 1986. effect [5]. Szücs based on the mergers and acquisitions of 265 major companies and 133 target companies in the United States and the European Union from 1990 to 2009, found that mergers and acquisitions have a significant negative impact on the target company's R&D growth rate and R&D intensity ; Wang Yue is based on the research on the performance of technology mergers and acquisitions of China's 1997-2014 CNC machine tool listed companies shows that the performance of different technology M&A events is obviously different in terms of innovation performance, and the overall performance after M&A does not increase and decrease.

## **4. The Main Relevant Factors of Technology Mergers and Acquisitions Affecting the Innovation Performance of Enterprises**

### **4.1 Target Company Selection**

The success of technology mergers begins with choosing the right target company. When the main company chooses the target company, it faces two difficult problems: the uncertainty of the target company's resources and information asymmetry. Often, the technical capabilities of the target company are complex and socially embedded. Although these special performances and the company bring technical capabilities that are difficult to imitate, they also cause serious uncertainty and increase the difficulty of value assessment. In response to the uncertainty of the target company's technical resources and information asymmetry, the target selection ability of the main company is particularly important.

### **4.2 Master and Company's Own Capabilities**

#### **4.2.1 Integration.**

According to the report on foreign investment in technology, media and telecommunications industry, "from the case of overseas enterprise technology media and communications (TMT) overseas M&A failures, the case of integration is over 50%. The process of M&A integration is to determine the success of M&A. The key to whether or not, cultural differences also strengthens the difficulty of enterprise integration, which will lead to complementary compatibility will lead to inefficient integration, especially in cross-border mergers and acquisitions [6]. Han Junhua subdivided the technology integration and pointed out that the corresponding integration strategy is needed to make the technology merger and acquisition have a positive impact on enterprise innovation. Some scholars believe that there is a need to balance the integration and autonomy.

#### **4.2.2 Leadership.**

Senior leadership plays a key role throughout the M&A process. The decision-making preferences and heterogeneous experience of senior leaders have a significant impact on post-merger performance. Schmidt's study found that when boards of directors have professional advice and knowledge in technology M&A activities, they tend to be associated with higher M&A performance. Kim show that longer term positions allow independent directors to drill down Understanding the specific knowledge of technical companies, the length of the term of independent directors will negatively affect the probability, frequency and scale of mergers and acquisitions, but it is significantly positively correlated with M&A performance. In addition, corporate governance plays an important role in strategic and complex decisions such as technology mergers and acquisitions [7]. In the corporate governance structure, the board of directors exerts influence primarily through two core functions of supervision and consulting.

### 4.3 Technical Knowledge Matching

The acquisition of technical knowledge is the most significant feature of technology mergers and acquisitions that distinguish it from other types of mergers and acquisitions. The size and nature of the technical knowledge acquired by the main company from the target company directly determines the maximum “integration potential” of the parties.

The nature of technical knowledge is matched, and the nature of technical knowledge is divided into knowledge similarity and knowledge complementarity. When the similarity between the two parties is low and the complementarity is high, the number of innovations decreases, but the quality of innovation increases. When the technical knowledge of both parties acquires the balance of appropriate benefits in terms of similarity and complementarity, the integration potential is likely to reach its maximum. Mao Di, Shi Jianjun, and Chen Xiaolin combined with the 2010-2015 China high-tech industry listed companies' technology M&A data to empirically test that the knowledge similarity between the two parties and the innovation performance are inverted U-shaped. To further reveal the impact of the nature of technical knowledge on M&A performance, Wang Wanli differentiated knowledge overlap into overlapping knowledge of the target company and overlapping knowledge of the main company. Research shows that although the target company's knowledge overlap and the main company's knowledge overlap enhance the relationship between the target company's capabilities and corporate innovation.

The matching of technical knowledge scale, the greater the stock of the target company's technical knowledge, the greater the economies of scale and scope of the enterprise's knowledge stock after integration, the greater the potential for innovation and integration. However, this positive effect is short-lived and, over time, may hinder the company's technological innovation. Sevilir & Tian's research shows that the larger the knowledge stock of the target company compared to the main company, the better the innovation performance after the merger.

## 5. Conclusions and Prospects

The research of foreign scholars mainly includes: research on the effect of technology mergers and acquisitions on the innovation ability of enterprises, decision-making and model selection research. Most domestic scholars have followed the research ideas of foreign scholars and conducted relevant empirical research on domestic technology mergers and acquisitions, and made a lot of progress. However, compared with traditional mergers and acquisitions, technology mergers and acquisitions have great differences in target selection and post-consolidation. At present, the academic community has initially conducted a series of explorations on the performance of technology mergers and acquisitions. Most of them have discussed the impact of technology mergers and acquisitions on innovation performance and financial performance. However, the performance measurement indicators have not yet formed a consensus evaluation index system, and the conclusions have not yet been unified. In addition, it may take a certain amount of time for technology mergers and acquisitions to form enterprise innovation performance. Most of the research at home and abroad still only studies the performance analysis within two years after the merger, and the research is relatively one-sided.

Finally, more and more technology M&A practices in China urgently require evaluation of M&A events. This requires detailed statistics and summarization of technology mergers and acquisitions that have taken place at home and abroad, to identify the industries in which technology mergers and acquisitions occur, and to evaluate the success of technology mergers and acquisitions, and to evaluate the effects of these mergers and acquisitions using evaluation models. More important is to continue to promote similar research in the Chinese context. Attention should be paid to China's unique institutional and policy environment. We should pay attention to China's unique institutional and policy environment and strengthen its understanding of China's unique institutional environment to guide future mergers and acquisitions.

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