

Finance for Science and Technology: From Innovation to Entrepreneurship and Industrial Transformation

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Abstract

The integration of financial resources with technological innovation is essential for driving economic growth and fostering social development. This review explores the mechanisms through which Finance for Science and Technology (FST) supports technological advancements, entrepreneurship and industrial transformation. By analyzing the impact of financial support on innovation, industrial transformation, and financial sector evolution, this review highlights the pivotal role of FST in the technology commercialization, new productivity development and high-quality growth of the economy. Additionally, this review examines future trajectory of FST, offering insights into how targeted financial strategies can continue to promote sustainable development and long-term industrial competitiveness.

Keywords: Finance for Science and Technology (FST); Industrial Economy; Technological Innovation; Industrial Transformation

Introduction

In the transition towards knowledge-based economies, the role of finance in fostering technological innovation is becoming increasingly critical. Finance for Science and Technology (FST) is instrumental in bridging the gap between research and technological innovations. Recent studies emphasize that targeted financial support for technology-driven sectors accelerates the commercialization of scientific discoveries, thereby driving economic growth and societal progress. This integration of finance and technology has been pivotal in transforming industries and shaping modern economic strategies, particularly in emerging fields such as green technology and digital transformation [1].

Technological Aspect: First Step for Commercialization of Scientific and Technological Innovation

The effective integration of financial resources with technological innovation enables the successful commercialization of scientific advancements. Strategic financial decisions within technological sectors influence environmental and social governance practices, emphasizing the importance of FST in modern economic strategies. Continuous capital flow into technological innovation supports high-tech industries and promotes the transition of innovations from the research phase to market-ready products [2].

For example, in China, the development of FST has evolved significantly, moving from administrative financial allocations in the 1980s to a more sophisticated and integrated system today. This evolution has allowed for the creation of advanced technological hubs in areas such as artificial intelligence, robotics, and quantum information. These advancements underscore the importance of sustained financial investment in fostering technological breakthroughs that drive both economic growth and societal progress [3].

Industrial Aspect: Catalyzing Entrepreneurship and Industrial Transformation with Technological and Financial Innovation

FST plays a critical role in accelerating industrial transformation and upgrading by supporting enterprises deeply rooted in technological innovation. This support is particularly crucial for high-risk, high-growth sectors that traditional financing often overlooks. The application of real-time processing systems and the Internet of Things (IoT) in industry development showcases how FST facilitates the adoption of advanced technologies that drive industrial transformation [4].

Additionally, the impact of digital finance on entrepreneurship in less developed regions demonstrates how FST can spur economic development by empowering entrepreneurs in high-tech industries [5]. These developments are vital for achieving high-quality economic growth and sustaining long-term industrial competitiveness. For instance, FST has been instrumental in the development of new industries like hydrogen energy and intelligent connected vehicles, which are key to the industrial transformation of economies aiming for high-value production and innovation-driven growth.

Financial Aspect: Revolutionizing Financial Products, Services, and Policies for Science and Technology Innovation

The evolution of financial products and services is another significant aspect of FST. The incorporation of advanced technologies, such as big data analytics and artificial intelligence, into financial services has led to the creation of innovative financial products that better meet the needs of technology-driven industries [6]. The influence of digital finance on green technology innovation provides insights into the transformative power of FST in promoting sustainable development.

Moreover, the integration of digital finance with environmental regulation has been shown to drive green technology innovation, further underscoring the critical role of FST in the modern financial ecosystem. This evolution is not just about creating new products but also about transforming the financial infrastructure to better support technological advancements (Figure 1). For instance, the role of financial technologies in enhancing the efficiency and effectiveness of financial services has been critical in supporting the digital transformation of both enterprises and financial institutions [7].

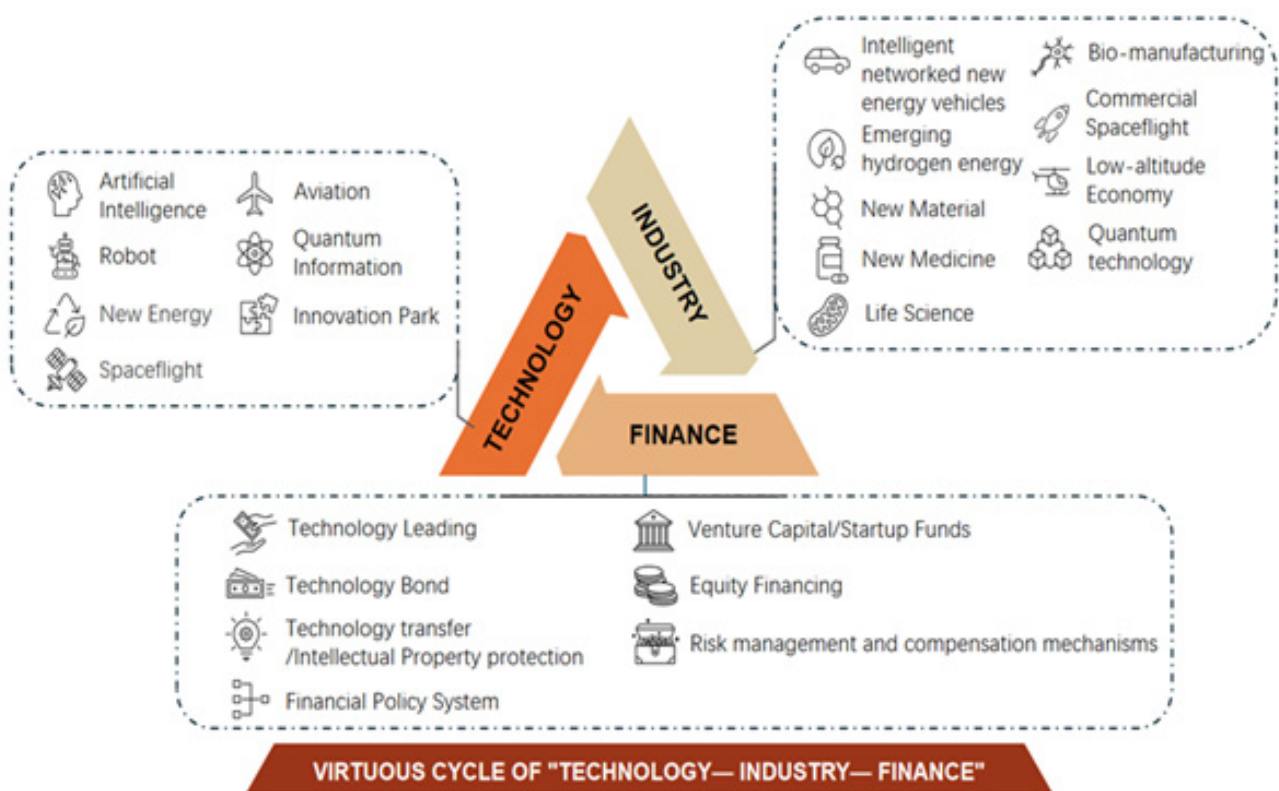


Figure 1: Virtuous cycle of “Technology-Industry-Finance.”

Conclusion and Prospect

The integration of financial resources with technological innovation is essential for the continued growth and development of modern economies. FST not only supports the commercialization

of new technologies but also drives industrial transformation and enhances the financial sector’s capacity to support innovation. As the global economy becomes increasingly reliant on technology, the role of FST will continue to grow in importance, providing the necessary capital to fuel future

Innovations and Ensure Sustainable Economic Development

Looking forward, the future trajectory of FST will likely involve deeper integration with emerging technologies and more targeted financial policies aimed at fostering innovation in critical areas such as green technology and digital transformation [8]. By continuing to evolve and adapt, FST will remain a cornerstone of economic development and technological progress in the coming decades.

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