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The connection between academic achievements and market demand: The role and practice of technology and innovation in knowledge transfer

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Abstract: With the advancement of science, technology, and innovation, the mechanism for transforming academic research into commercially viable solutions has become a key area. This study aims to explore how science, technology, and innovation can collaborate to promote the commercialization of academic achievements, and to reveal their roles and obstacles in this process. Through case analysis of stakeholders such as academia, business, and technology transfer offices, combined with semi-structured interviews and non participatory observations, this study delves into the main mechanisms of knowledge transfer, how innovation drives this process, and the challenges that exist. Research has found that knowledge transfer is achieved through three mechanisms: formal collaboration, informal networks and open innovation, as well as knowledge absorption and adaptation. In addition, technological innovation, especially artificial intelligence, data analysis, and blockchain technology, has become a catalyst for accelerating the transformation of academic research into commercial applications. However, the inconsistency of expectations between academia and business and intellectual property issues remain the main obstacles in knowledge transfer. This study provides a theoretical basis for cooperation between academia and industry, and offers practical suggestions for improving knowledge transfer mechanisms.

Keywords: *Academic achievement transformation, Commercialization, Innovation driven, Knowledge transfer, Technology transfer.*

1. Introduction

With the accelerated development of global technological innovation, research achievements in academia are gradually moving from theory to practice, promoting the gradual realization of commercialization process. Technological innovation, especially breakthroughs in fields such as artificial intelligence and big data analysis, has become an important driving force for promoting the transformation of academic achievements into market applications (Johnson et al., 2021). However, despite advances in science and technology providing new opportunities for commercialization, the collaboration model between academia and business still faces many challenges (O'Dwyer et al., 2023). How to effectively transform academic research into commercial applications has become a global research hotspot (Lee et al., 2021). The process of transforming academic achievements into commercial applications involves various mechanisms and dynamics. Traditional knowledge transfer theories typically focus on a single mode of knowledge dissemination, neglecting the crucial role of factors such as innovation and technological breakthroughs in the transformation process (Sun et al., 2021). Existing research often emphasizes the forms or commercialization pathways of technology transfer (Hayter et al., 2020), but there is still a lack of in-depth and systematic exploration on how science, technology, and innovation can collaborate and effectively address the gap between academic research and market demand. Especially in the context of rapid technological development, how to combine new innovation models such as open innovation and digital platforms to promote the commercial application of

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academic achievements remains a major challenge in current research (Aquilani et al., 2020). This study aims to fill this gap by analyzing how science, technology, and innovation work together to promote the transformation of academic research into commercially viable solutions. The research will specifically focus on three core questions: 1) How can academic research be transformed into commercial applications through which main mechanisms? 2) How can technological innovation play a catalytic role in the process of knowledge transfer?

3) What are the main obstacles in the process of knowledge transfer? Through these questions, this study aims to provide theoretical support for the collaboration between academia and business, and propose practical suggestions for improving the mechanism of knowledge transfer. In order to address the above three issues, this study adopts a case analysis method, combined with semi-structured interviews and non participatory observations, to explore the roles and interactions of multiple stakeholders such as academia, industry, and technology transfer offices in the process of knowledge transfer. Specifically, this study will focus on academic researchers, business professionals, and representatives of technology transfer offices, analyzing their different roles and challenges in the process of knowledge transfer. Data collection will be combined with interview content, document review, and non participatory observation to ensure a profound understanding of the research topic.

The findings of this study indicate that the main mechanisms for translating academic achievements into commercial applications include three interrelated modes: formal collaboration mode, informal network and open innovation mechanism, and knowledge absorption and adaptation mechanism. Firstly, the formal collaboration model establishes a structured partnership between academia and business, such as technology transfer through technology licensing agreements or derivative companies. Secondly, informal networks and open innovation models enable the academic and business communities to exchange knowledge and innovate technologies without formal contracts, especially in emerging fields such as artificial intelligence. Finally, the knowledge absorption and adaptation mechanism indicates that enterprises can effectively integrate academic achievements into existing business strategies and product development by enhancing their absorptive capacity. Innovation, especially technological progress, plays a catalytic role in this process. The application of technologies such as artificial intelligence and big data analysis has accelerated the market transformation process of academic research. For example, Xiaomi has optimized the design of new energy vehicles through the use of artificial intelligence, which not only enhances the market adaptability of its products, but also shortens the product development cycle. Innovation centers and incubators have also played an important role in promoting the transformation of academic achievements, providing a good platform for collaboration between academia and business. However, research has also found that differences in goals, intellectual property issues, and communication barriers in collaboration between academia and business remain the main obstacles in the process of knowledge transfer. These obstacles limit the efficiency of technology transfer and hinder the rapid commercialization of academic achievements.

This study provides a new theoretical perspective for cooperation between academia and industry, particularly offering unique insights on how to promote the commercialization of academic achievements through innovation. By combining technological innovation with commercialization strategies, the study reveals the specific mechanisms by which academic research is transformed into commercial applications, providing empirical evidence on how innovation accelerates this process. The research findings provide practical recommendations for policy makers, academic institutions, and businesses, especially on how to optimize knowledge transfer mechanisms and enhance the market adaptability of academic achievements. In addition, this study also expands the theory of knowledge transfer, particularly regarding the role of innovation in promoting the transformation of academic research, providing a theoretical basis and research framework for future research in related fields.

2. Literature Review

For a long time, the interaction between academia and industry has usually been explored within the framework of knowledge transfer. However, the specific roles played by science, technology, and innovation in this process have not been fully studied. In existing literature, several key issues have emerged that are crucial for revealing the mechanisms by which academic research can be transformed

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into commercial value. The main topics include knowledge transfer models, commercialization processes, and how innovation plays an important role in bridging the gap between theory and practical applications.

2.1. Knowledge Transfer Model

Early research on knowledge transfer mostly focused on linear models, which believed that knowledge flows unidirectionally from research institutions to enterprises (Fabiano et al., 2020). According to this viewpoint, new knowledge generated by academic research is subsequently "pushed" into the business field, typically manifested as patents or innovations that companies can adopt (Malik et al., 2021). However, this model was criticized for oversimplifying the complexity of the transfer process and ignoring the dynamic interaction between academia and industry (Cai&Lattu, 2022). In contrast, the interactive model of knowledge transfer emphasizes more on the flow of information between academia and business (Hayter et al., 2020). These models suggest that knowledge transfer is not just a one-way, passive process, but a process of active participation and repeated interaction between both parties, jointly creating new knowledge (Skipper&Pepper, 2021). The triple helix model has been extended based on this, highlighting the interrelationships and cooperation between government, industry, and academia, and suggesting that innovation is driven by collaboration among universities, businesses, and policy makers (Bellandi et al., 2021). The four helix model further incorporates civil society and emphasizes the important role of the public in the innovation process, further deepening this concept (Carayannis et al., 2022). Despite significant progress in understanding knowledge transfer models, there is still a gap in research on how specific components of science, technology, and innovation interact to drive knowledge exchange (Olan et al., 2022). Although theories such as the triple helix model have high value, they often fail to delve into the specific mechanisms by which technological progress or scientific breakthroughs drive or limit knowledge transfer processes (Linton, 2024).

2.2. Commercialization of Academic Research

The commercialization of academic research is another important topic in the literature. Commercialization refers to the process of transforming research results into marketable products, services, or technologies (Chukhray et al., 2022). At present, the academic community has explored various stages of commercialization, including intellectual property protection, patents, technology licensing, and the creation of derivative companies (Fasi, 2022). These studies focus on institutional factors that influence the commercialization process (Moradi, 2021), such as the existence of technology transfer offices, partnerships between universities and industry, and financing mechanisms (Daniel&Alves, 2020). However, the current focus is mainly on the marketability of research results, rather than the potential innovation that drives their transformation into the market (Wang et al., 2021). Scientific and technological innovation, such as new production methods, breakthroughs in artificial intelligence, or advances in materials science, often play a crucial role in making academic achievements applicable to commercial needs (Wang et al., 2023). However, many studies on commercialization have overlooked how to integrate these innovations into broader business strategies (Cubero et al., 2021). This is a critical gap that needs to be addressed in order to fully understand the dynamic relationship between academic research and commercial applications.

2.3. Science, Technology, and Innovation in the Process of Knowledge Transfer

The role of science and technology as innovation drivers in the process of knowledge transfer is increasingly valued (Gui et al., 2022). The ability of enterprises to identify and utilize new knowledge from external sources is crucial for innovation (Hervas Oliver et al., 2021). This concept is particularly important for understanding how businesses integrate academic research into their operations and product development. Furthermore, the discussion can be further expanded by introducing the concept of open innovation, where companies actively seek external knowledge to enhance their innovation process (Adamides&Karacapilidis, 2020). Open innovation contrasts with the traditional closed innovation model, in which the enterprise develops all new products or technologies internally (Grama

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Vigouroux et al., 2020). Adopting open innovation enables enterprises to leverage the vast amount of knowledge generated by academic research, accelerating the transformation of academic achievements into commercially viable solutions (Jayabalan et al., 2021). The latest advancements in digital technologies such as artificial intelligence, machine learning, and blockchain have also reshaped the landscape of innovation and knowledge transfer (Zhang et al., 2024). These technologies not only provide the tools needed to accelerate the commercialization process, but also open up new avenues for collaboration between academia and industry (Beck et al., 2022). Digital platforms have facilitated real-time data sharing and enabled interdisciplinary collaboration that was previously impossible (Mihai et al., 2022). This is particularly evident in fields such as biotechnology, where data-driven technology plays a crucial role in transforming academic research into marketable health products and solutions (Fidan et al., 2023). Despite these advances, there is still a lack of a comprehensive framework in the literature that integrates the roles of science, technology, and innovation as intertwined elements in the transfer process (Pandey et al., 2022). Most models focus on one or two of these elements, but fail to consider how they work together to drive the successful translation of academic knowledge into commercial outcomes.

2.4. Challenges and Opportunities of Knowledge Transfer

The challenges of knowledge transfer between academia and industry are well-known. Inconsistent goals, different timelines, and communication barriers often hinder cooperation (Morrison Smith&Ruiz, 2020). In addition, academic researchers often tend to publish research results rather than commercialize them, which creates a contradiction between academic success and practical application of research (Suhaimi et al., 2022). However, opportunities for improving knowledge transfer are constantly emerging. The rise of innovation centers, accelerators, and incubators has promoted closer connections between universities and businesses, helping to bridge the commercialization gap (Lyken Segosebe et al., 2020). These initiatives bring together academic researchers, entrepreneurs, investors, and industry experts to jointly create new technologies, products, and services (Ewim, 2023). University led incubators are already common in many countries, where researchers can develop their ideas into startups with the support of industry partners. In addition, the increasing emphasis on sustainability and social impact has opened up new avenues for collaborative innovation (Leminen et al., 2021). As the industry faces increasing pressure to adopt more sustainable practices, academic institutions can play a key role in providing the scientific and technological innovation needed to address these challenges (Alraja et al., 2022).This provides fertile ground for cooperation, which can not only advance business goals but also contribute to broader social outcomes.

3. Research Methods

This study adopts a case analysis method and combines semi-structured interviews with non participatory observation to explore the knowledge transfer mechanism and dynamics between academic research and business applications, with a particular focus on the role of science, technology, and innovation (Franco et al., 2024; Majuri, 2022); Angrisani et al., 2023）。Given the complexity and background of the topic, qualitative research is particularly suitable for capturing the profound experiences and perspectives of the main stakeholders involved in the knowledge transfer process. The study will analyze in detail real cases of collaboration between academic institutions and business organizations through multiple case designs.

3.1. Research Object

The research subjects include three different groups: academic researchers, business professionals involved in research and development or innovation management, and representatives from technology transfer offices or innovation centers. These groups have significant importance in understanding their respective roles and perspectives in the process of knowledge transfer. Firstly, academic researchers mainly come from universities or research institutions, focusing on cutting-edge scientific and technological research. They typically participate in the creation of innovative knowledge, the development of solutions, or the publication of research results applied to practical problems. Priority

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should be given to researchers from the School of Science and Engineering, especially experts in fields such as biotechnology, information technology, and materials science, whose research has direct potential for commercial applications. Secondly, business professionals include industry representatives such as R&D managers, product development experts, and innovation managers who adopt and apply academic research findings in their business processes. These professionals are responsible for identifying promising research results and exploring ways to transform them into new products, services, or technologies, covering multiple fields such as technology, healthcare, manufacturing, and sustainable development. Finally, representatives from the Technology Transfer Office and Innovation Center, mainly including staff from the Technology Transfer Office, Innovation Center, and Business Incubator, serve as bridges between academia and industry, promoting the licensing, patent, and commercialization processes of academic research, and providing guidance on business strategy, intellectual property management, and collaboration between academia and business.

The study used purposive sampling methods and selected participants from each group based on the theory of information saturation. Specifically, the first group selected 8 academic researchers, the second group selected 9 business professionals, and the third group selected 6 representatives from technology transfer or innovation centers, totaling 23 participants. This sample size ensures the comprehensiveness and depth of research information, coveringdiverse perspectives from both academia and industry. The selection criteria for participants are based on their experience and influence in the relevant field. The selection of academic experts relies on their experience in participating in high impact or innovative research projects, while business professionals are selected based on their specific roles in translating academic research into commercial applications. Representatives of technology transfer offices and innovation centers are selected based on their experience in promoting academic and industrial cooperation. Each participant will be interviewed individually to gain a deeper understanding of their experiences, challenges, and how innovation promotes business outcomes in the process of knowledge transfer. Data collection combines semi-structured interviews with non participatory observation to flexibly explore participants' experiences andmaintain research focus. Semi structured interviews help to delve into specific topics related to research questions, such as the role of innovation in knowledge transfer, challenges encountered during the process, and coping strategies. Each interview is expected to last about 60 minutes, and with the consent of the participants, it will be recorded and transcribed word for word for subsequent analysis. In addition, what was seen and heard during the non participatory observation process was also recorded in detail, and relevant secondary data such as cooperation agreements, commercialization documents, and patent applications wereanalyzed.

3.2. Data Analysis Steps

The data analysis will adopt the thematic analysis method, which is widely used in qualitative research to identify and analyze patterns and themes in the data. The process of thematic analysis will be divided into several stages: firstly, the data familiarization stage, where all interview records and secondary data will be carefully reviewed to ensure that researchers have a thorough understanding of the data content. Next is the initial encoding stage, where text paragraphs related to the research question will be encoded and the data will be broken down into small units that can be classified. Then comes the stage of theme development, where preliminary coding will be integrated into broader themes, reflecting key issues and dynamics in the knowledge transfer process. Finally, there is the explanation stage, during which researchers will provide in-depth explanations of the identified themes based on the background of the research question, and construct the connection between theoretical frameworks and empirical data. In order to ensure the rigor of the research and the validity of the data, triangulation was used in this study. Collect different types of data (including interviews, documents, etc.) from academic researchers, business professionals, and technology transfer offices, and enhance a comprehensive understanding of the knowledge transfer process through cross comparison of data. The study strictly adheres to ethicalregulations, ensures informed consent of participants, and respects their right to withdraw at any time. All participants' information will be processed anonymously, and no identity information will be disclosed in the research report. The research will apply for ethical approval from the relevant ethics committee before it officially begins.

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4. Research Finding

The results of this study are based on case analysis, semi-structured interviews, and non participatory observation data collected, as well as supplementary documents such as cooperation agreements and commercialization reports. The analysis of these data has yielded several key insights.

4.1. Knowledge Transfer Mechanism

This section revolves around the first research question, which is how academic research can be transformed into commercial applications through primary mechanisms. The transfer of knowledge between academia and business typically occurs through various mechanisms that are interrelated and influenced by science, technology, and innovation. According to data analysis, there are three main mechanisms that can effectively promote the commercialization of academic achievements. Firstly, the formal cooperation model is one of the main mechanisms. This model usually manifests as a structured cooperative relationship between universities and enterprises, including research partnerships, technology licensing agreements, and the establishment of derivative companies. Research has shown that this formal collaboration model is particularly effective when academic research results are highly aligned with business goals. Taking the new energy vehicle design project jointly developed by Xiaomi and Peking University as an example, the clear technology license agreement and the participation of a dedicated technology transfer office have successfully promoted the commercialization of academic discoveries, making them practically feasible in the market. In this process, the gap between academia and industry has been effectively bridged through new scientific research achievements presented in the form of innovative technology. The key to this model is to ensure the rapid transformation and implementation of academic research achievements in the business environment through a clear cooperation framework and agreement. Secondly, informal networks and open innovation are another important mechanism. In this mechanism, many enterprises, especially those in the technology industry, participate in knowledge transfer and application by establishing informal cooperation networks and adopting open innovation strategies. This type of innovation typically does not rely on formal contractual agreements, but rather obtains ideas and technological solutions from external academic researchers, entrepreneurs, or other organizations. For example, Xiaomi collaborated with researchers from Tsinghua University to develop an artificial intelligence algorithm, which was ultimately successfully adapted and applied to the home service industry. Through this informal collaboration model, enterprises can timely obtain academic research results, especially cutting-edge knowledge in fields such as artificial intelligence and sustainable technologies, which often do not have formal commercial agreements. By establishing industry university research roundtables and knowledge exchange platforms, enterprises can accelerate the transformation of academic achievements into new products and services at a lower cost. The advantage of open innovation lies in its flexibility and quick response to market changes, enabling enterprises to gain technological leadership in a fiercely competitive environment. Finally, knowledge absorption and adaptation constitute the third mechanism. This mechanism emphasizes how enterprises can effectively integrate academic knowledge into existing business practices and strategies by absorbing and adapting it. If a company has a high absorption capacity, that is, the ability to identify, absorb, and flexibly apply external knowledge, then this mechanism can play the greatest role. According to interviews with business professionals, companies with strong internal innovation cultures and R&D(Research and Development) investments are often better able to translate academic achievements into concrete business applications.For example, Xiaomi has promoted the deep integration of academic research results with the company's product line by establishing a dedicated academic exchange department. The core of this mechanism lies in the establishment of effective internal innovation processes by enterprises to absorb and quickly transform external academic discoveries into valuable products or services. The transfer of knowledge between academia and business not only relies on external introductions, but also requires companies to have good internal adaptability to ensure that new knowledge can be quickly implemented and tested in practical applications. The results of semi-structured interviews further support the effectiveness of these mechanisms. In the interview, the company representative mentioned that the formal cooperation

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model can provide a reliable cooperation framework and financial support, especially in the field of technology. And informal networks are considered to be able to quickly obtain cutting-edge research results, especially when technological innovation is needed to drive product iteration. Finally, multiple interviewees emphasized that the innovation culture and R&D investment of enterprises are the key to the success of knowledge absorption and adaptation mechanisms. Only when enterprises have strong internal knowledge integration capabilities can academic research be more smoothly transformed into commercial applications. These interview results provide strong empirical support for the three mechanisms mentioned above from a practical experience perspective, and further deepen our understanding of the knowledge transfer process between academia and business. The commercialization of academic research results is not achieved through a single mechanism, but through the interaction of multiple mechanisms such as formal cooperation models, informal networks, and knowledge absorption and adaptation. These mechanisms complement each other and jointly promote the close integration of academic research and business practice, enabling academic innovation to achieve value transformation in practical business environments.

4.2. The Role of Innovation in Knowledge Transfer

This study delves into the second research question, which is how technological innovation plays a catalytic role in the process of knowledge transfer, and elucidates the unique role of innovation as a key driving force for knowledge transfer. Research has shown that innovation is not only the result of knowledge transfer, but also an important factor in promoting knowledge exchange and transformation. In the context of rapid technological development, technological innovation has become a catalyst for accelerating the connection between academic research and commercial applications, especially in the application of technologies such as artificial intelligence, data analysis, and blockchain, which promotes the transformation of academic achievements into practical products and services. Firstly, technological innovation promotes real-time collaboration between academia and industry by providing new tools and platforms. Xiaomi has achieved efficient communication between academic researchers and industry experts through its artificial intelligence platform "Xiao Ai Tongxue". This platform not only has functions similar to intelligent assistants, which canhelp users quickly obtain knowledge information, but also optimizes the depth and accuracy of knowledge understanding through its powerful machine learning algorithms, greatly reducing common communication barriers in the traditional knowledge transfer process. With the support of this platform, researchers and industry experts can collaborate more quickly, accelerating the transformation process from theoretical research to practical applications. In the research and development process of Xiaomi's new energy vehicles, academic research based on ergonomics has been more efficiently applied with the help of artificial intelligence platforms. Machine learning algorithms have helped optimize product design and shorten the product development cycle. During this process, the artificial intelligence platform played a significant role, not only accelerating the conversion between research and practice, but also effectively enhancing the market competitiveness of the product, ultimately shortening the time to market by more than 40% compared to expectations. Secondly, innovation centers and incubators also play a crucial role in promoting innovation driven knowledge transfer. These innovative ecosystems provide an interactive and collaborative platform for academia, startups, and mature enterprises, promoting knowledge sharing and application. Taking Xiaomi as an example, the company actively participates in multiple innovation ecosystems, closely collaborates with universities, research institutions, and other enterprises, and promotes the integration of academic research and business needs. Business incubators provide a bridge for researchers and startups to enter the market, enabling innovative business models based on academic research to quickly land and be promoted.Through case analysis ofmultiple enterprises, we can see that the innovation ecosystem not only provides a physical space for joint research, but also promotes the commercialization process of innovation through cross-border collaboration. This multi stakeholder collaboration model, especially in the context of interdisciplinary and cross industry cooperation, significantly improves the market-oriented efficiency of academic achievements. In semi-structured interviews, participants generally believed that the interaction between technological innovation and knowledge transfer has become the core driving force for the sustainable development of enterprises.

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Many corporate executives say that innovation centers and incubators are key platforms for them to drive the transformation of technological achievements and seek market opportunities. For example, the person in charge of an innovation incubator pointed out, "We not only provide financial and technological support, but more importantly, create an environment that promotes cooperation between enterprises and academia. Such cooperation makes us more agile in the research and development process and can identify industry trends and needs faster." Through the promotion of these platforms, the results of academic research can be quickly transformed into practical applications, meeting the needs of the market and society, and further promoting the smooth transfer of knowledge. Technological innovation and innovation ecosystems play a crucial role in the process of knowledge transfer. They provide strong support for the smooth transformation of knowledge from academia to business by offering new communication tools, collaboration platforms, and business models. Especially in the high-tech industry, innovation is not only a catalyst for knowledge transfer, but also a core driving force for promoting socio-economic development and technological progress.

4.3. Obstacles to Effective Knowledge Transfer

This study aims to explore in depth the main obstacles in the process of knowledgetransfer, with a particular focus on the challenges in collaboration between academia and industry. Although existing research has revealed some successful cases of knowledge transfer between Xiaomi and university institutions, it has also exposed some obstacles, especially in areas involving significant technological innovation, where the path of knowledge transfer is not always smooth. By combining semi-structured interviews, non participatory observations, and practical case analysis of Xiaomi, this study further elucidates these obstacles and their specific manifestations. The inconsistency between expectations and goals is a common issue in academic research and industry collaboration. Researchers in academia typically focus on advancing the depth and breadth of scientific knowledge, as well as publishing high-quality research results. Industry professionals, on the other hand, are more concerned with the market applicability, profitability, and product innovation of the results. In this context, academic research results are often difficult to directly translate into commercial value, especially in fields involving high technological barriers. In the early stages of Xiaomi's entry into the design of new energy vehicles, due to the segmented nature of the market and high research and development costs, academic research results were difficult to quickly translate into products that met market demand. The initial research focused solely on technological innovation, lacking a profound understanding of market demand, which resulted in a significant disconnect between academic research and Xiaomi's product line. Through interviews with Xiaomi's technology development engineers and product managers, it was found that although academic research results are innovative, they cannot bring operational business value to the company in the short term, resulting in differences in expectations and goals between the two. Intellectual property management issues are also a common and challenging obstacle. Xiaomi's technology development engineers and product managers pointed out that complex legal and procedural issues are often encountered when negotiating intellectual property with university institutions, leading to delays in the commercialization process. Many academic research results have ambiguous areas in terms of property ownership, especially when the research is conducted within the framework of cooperation between universities and enterprises, issues such as ownership and patent licensing of the results become bottlenecks in cooperation. Taking the cooperation between Xiaomi and a well-known university as an example, the long-standing dispute over patent ownership between the two parties resulted in the inability to timely translate technological achievements into actual product development, thereby delaying the time for product launch. According to the results of semi-structured interviews, participants generally believe that there is a lack of clear intellectual property frameworks between academia and industry, which greatly increases the complexity and uncertainty of cooperation. Cultural differences and communication barriers are also key factors. There are significant differences between academia and industry in terms of work styles, thinking patterns, and communication habits. Academic researchers usually focus more on independence, exploration, and theoretical depth, while professionals in the industry tend to be pragmatic and business oriented. This cultural difference can easily lead to poor communication. Research has found that academic researchers

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may lack a practical application perspective when facing industrial demands, and may not be adept at collaborative thinking in a business context; However, professionals in the business field may lack a deep understanding of academic research and may not fully comprehend the technical complexity of research outcomes. This cognitive gap hinders the smooth flow of information between academia and industry, delaying the process of transforming academic research results. Through non participatory observation of the cooperation between Xiaomi and universities, it was found that there are often misunderstandings in information transmission between project management teams and academic researchers during the communication process, especially in the lack of effective communication mechanisms between technical requirements and the applicability of research results.

5. Research Contribution

The contribution of this study is divided into two parts: theoretical contribution and practical contribution. Theoretical contributions can be mainly divided into three types. The first is to deepen the understanding of knowledge transfer models. This study expands existing knowledge transfer models by revealing the specific mechanisms by which academic research is transformed into commercial outcomes, particularly by integrating how science, technology, and innovation intersect in this process, filling the gaps in the literature. Research has shown that knowledge transfer is not just a one-way process, but a dynamic interaction between academia and industry, with innovation being the core driving force behind this interaction. The second is the mediating role of innovation. This study delves into the key role of innovation in translating academic research into business solutions, demonstrating that innovation is not only a manifestation of final output, but also a catalyst for knowledge transfer. Through innovative tools such as artificial intelligence, blockchain, and other technologies, academia and business can overcome barriers, optimize collaboration efficiency, and accelerate commercialization processes. The third is the construction of theoretical framework. This study proposes a comprehensive framework that combines the three main mechanisms of knowledge transfer, formal cooperation mode, informal networks and open innovation, knowledge absorption and adaptation, with the driving role of innovation, providing a new theoretical perspective for cooperation between academia and industry, especially in the context of interdisciplinary cooperation and complex technology transfer.

There are also three actual contributions, the first of which is the strategy to promote cooperation between academia and the business community. The "formal cooperation mode" and "informal network cooperation" mechanisms proposed in this study provide practical guidance for the academic and business communities on how to overcome technological and cultural differences in the cooperation process. These mechanisms have important practical significance for promoting the commercialization of academic research results, especially in high-tech and emerging industries such as artificial intelligence and new energy vehicles. Next is the innovation driven knowledge transfer model. By demonstrating the role of innovation centers and business incubators in promoting knowledge transfer, this study provides practical basis for enterprises and governments on how to build innovation ecosystems, optimize resource allocation, and accelerate technology transformation. Especially in technology driven enterprises such as Xiaomi, innovation platforms and open innovation strategies have been proven to be key to accelerating the transformation of academic research results into viable market solutions. Finally, we need to address the barriers to knowledge transfer. The study analyzed common obstacles in the process of knowledge transfer, such as inconsistent expectations and intellectual property issues, and proposed corresponding solutions. By strengthening cross-border communication, optimizing intellectual property management, and improving the expected alignment between academia and industry, enterprises and academic institutions can collaborate more efficiently to jointly promote the commercialization of scientific research results.

6. Novelty

The novelty of this study lies in the following three points. The first is the mechanism model of cross domain fusion. The innovation of this study lies in proposing the intertwined role of science, technology, and innovation in the process of knowledge transfer, rather than analyzing their roles

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separately. By constructing a cohesive framework, it reveals how these three factors work together to drive the successful transformation of academic achievements into market driven commercial outcomes. The second is the analysis of the applicability of innovative tools. This study systematically explores emerging technologies such as artificial intelligence as tools to promote the commercialization of academic achievements for the first time, filling the research gap in existing literature on the practical application of these technologies in knowledge transfer processes. Through specific cases, such as Xiaomi's application of artificial intelligence algorithms, the actual effects of technological innovation in shortening product development cycles and improving market adaptability were analyzed. Finally, there is the construction of a bridge between the academic and business communities. The mechanism of "knowledge absorption and adaptation" proposed in this study emphasizes how enterprises can transform academic research results into market-oriented products and services through their inherent innovation culture and R&D investment, especially in the field of technology, which has important innovation. Through these innovative practical perspectives, research provides new strategic paths for deep cooperation between academia and industry.

7. Statement of Conflict of Interest

This study followed strict academic ethical standards in data collection and analysis. All participants have given informed consent and their privacy and data security are guaranteed.In the process of this study, the author declares that there are no economic or personal conflicts of interest. All research funding, collaboration agreements, and commercialization reports have not affected the fairness of the research process and results. Any commercial cooperation or technological development involved in the research process did not have a biased impact on data analysis, research conclusions, or results.

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