

博士論文 (要約)

An Enforced Loop-out Knowledge Flow Model  
and its Applications

(ループアウト型知識マネジメントサイクルに関する研究)

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# ABSTRACT

In the past 30 years, high concentration and a remarkable number of mergers can be observed in the genetically modified (GM) seed industry, leading to an oligopoly situation in which only a few companies control the market. Oligopoly leads several problems in GM seed industry, and decreases the competitiveness of GM seed industry. For the government, how to break oligopoly in GM seed industry would be an important issue. The development of GM seed industry is highly knowledge depending, and the players in GM seed industry usually use patent system to protect their intellectual property. Therefore, publishing the new technology through patent system to attract more generic GM seed players join the market would be a possible way to maintain the diversity and solve the oligopoly issue in GM seed industry. However, currently there is no generic GM seed even after patent expire, and the players in the GM seed industry do not increase. The market is still controlled by a few major players, and more and more people doubt whether the major players in GM seed industry build the entry barriers for the new players through the patent system.

On the other hand, to avoid higher price of medicine which resulted by oligopoly or monopoly, the U.S. pharmaceutical industry tried to facilitate generic drugs into the market by special policies. The case in U.S. pharmaceutical industry is successful, even the players in the industry are often using patent to protect their intellectual property as players in the GM seed industry. Therefore, this study use the U.S. pharmaceutical industry as a reference industry, to discuss how to facilitate the competition of GM seed industry. For the case of the U.S. pharmaceutical industry, the U.S. government has made special provisions for the U.S. pharmaceutical industry: namely, Orange Book, ANDA procedure, and Bolar Act, and these policies successfully maintain the diversity and competitiveness of the U.S. pharmaceutical industry through attracting the new

players.

This study further analyzes how these three policies affect knowledge flow and break oligopoly in the U.S. pharmaceutical industry. Based on the analysis, a “policy-enforced loop-out knowledge flow model” is proposed to explain how these three policies broke the oligopoly from the knowledge perspective. This study defines these three policies corresponding to three factors—product–patent linkage (PPL) disclosure, abbreviated regulatory path, and research and development freedom (R&D freedom), as a “Policy package”, to affect the corporate knowledge management, and facilitate the knowledge utilizing. Based on the policy-enforced loop-out knowledge flow model, this study illustrates the synergy effect of these policies as a combination of “knowledge confirmation,” “fast knowledge utilization,” and “reduced additional knowledge” from the knowledge perspective. PPL in a proprietary knowledge cycle determines whether the knowledge flow could be enforced to loop out from a proprietary knowledge cycle to third parties and then facilitates the industry competition. Compared to the U.S. pharmaceutical industry, there is no PPL disclosure to facilitate patented knowledge be used by third parties in GM seed industry, and that might be a reason why the patented knowledge cannot be used to launch the new products or generic products by third parties.

This study further exams the three factors in GM seed industry under current situation. Through knowledge flow analysis, this study reviews the patent portfolio of the biggest GM seed company, Monsanto, and analyzes the forward citations of glyphosate resistant soybean patents which filed by Monsanto. This empirical study demonstrates although the patented knowledge is cited by other companies, there is no GM soybean seed/variety launched by the third parties (excluding the major players). The empirical result also points out the different citation strategies between big 5 companies (major players) and third parties. This study also checks the importance of

R&D freedom by case study, and calculates the average spending days of field trial and examination of approved GM seeds/varieties, to show the importance of the abbreviated regulatory path for GM seed industry.

In conclusion, if the oligopoly in GM seed industry could be broken through attracting more players into the industry with generic products launching, the policy makers could design a policy package which has the similar functions to the three factors in the U.S. pharmaceutical industry, to attract the new players into GM seed industry and raise their willing and ability for launching a generic GM seed. Especially designing the policy for PPL disclosure, would be the first step to maintain the competitiveness of each player in GM seed industry.

However, there are some limitations of the applicability of the policy-enforced loop-out knowledge flow model. The limitation of PPL disclosure is linked to the knowledge portfolio of the products. If an industry protects its new products by only one or a few patents, the PPL may not be very difficult to understand. For the abbreviated regulatory path, its applicability depends on how the target industry is regulated by related policies. The last limiting condition is whether an industry has R&D freedom. R&D freedom links to the patent system and regulation issues, and, at times, could occur as a result of the previous two conditions.

In addition, future work could focus on identifying other factors that affect oligopolies and reduce the competitiveness of industry, such as distribution control, price control, and business models, as well as establish new methods for analyzing existing data.