



Choices and impacts of cross-licensing contracts



Dan Zhao^{a,b,*}

^a School of Management, Henan University of Science & Technology, Luoyang 471023, China

^b Antai College of Economics & Management, Shanghai Jiao Tong University, Shanghai 200052, China

ARTICLE INFO

Keywords:

Cost-reducing innovation
Quality-improving innovation
Quantity competition
Cross-licensing
Game theory
R & D policy

ABSTRACT

By relaxing the common assumption of a perfectly monopolized technology market, this article analyses strategic behaviors of incumbents upon technology licensing who hold cost-reducing/quality-improving technology, and examines some hot issues related to the implications on antitrust and welfare, the role of bargain in cross-licensing, the significance of both cost-reducing/quality-improving technology in competition. The findings show that: I) cross-licensing cannot necessarily enhance the degree of collusion, and further harms the consumer surplus and social welfare under quantity competition; II) when the rivals have the participated motivation to license, the outcomes of licensing games depend on the magnitude of innovation, the degree of differentiation on production cost and quality between the enterprises. With a small non-drastic innovation, only cost-reducing/quality-improving licensing occurs if there is a small/large cost difference and small quality difference. However, cross-licensing upon quality-cost does occur if small cost difference and large quality difference. Once with a major non-drastic or drastic innovation, only quality-improving licensing occurs regardless of production cost or product quality difference; III) in contrast that quality-improving technology could help increase the willing-to-pay by consumers with no drop on population, the enterprise that holds cost-reducing technology with drastic innovation could make zero production of the rival or expel it before/after licensing contract; IV) the cross-licensing parties with incomplete bargaining power happen to have the consistent aims to increase industry profit, which promotes the industry a virtuous cycle; V) government would rather support the post-outcome of cross-licensing than courage the ex-ante formation of R & D cooperation.

1. Introduction

For firms or research institutes holding patented technologies, technology licensing is of vital importance, especially when operating in an oligopoly market. Not only does technology licensing help them recover their R & D costs and increase economic profits, but it can also be used strategically. Considering that technology licensing only transfers the right of use rather than ownership, the technology licensing strategy has become one of the most important methods considered by patent holders to influence the behavior of their competitors as well as upstream and downstream firms. A typical example of such behavior is a patent battle between cellphone manufacturers, like the one between Apple and Samsung, or between Nokia and other Android-based cellphone manufacturers, etc.

Nagaoka and Kwon (2006) study more than 1100 technology licensing contracts of more than 260 listed manufacturing firms from Japan. Compared to unilateral licensing, cross-licensing generally exhibits a higher likelihood of occurrence in industries with a

* Correspondence address: School of Management, Henan University of Science & Technology, Luoyang 471023, China.

E-mail address: zhaodan911@gmail.com.

relatively high market concentration, which means that, the more obvious the characteristics of oligopoly in an industry, the higher the likelihood of cross licensing among firms operating in the industry. Such industries include the information technology industry, the electronic manufacturing industry, etc. In addition, it also implies that the existing studies of the strategic analysis of firms' unilateral technology licensing do not accurately and perfectly elaborate the technology licensing behavior of firms.

There are currently few studies on cross licensing among firms, especially in oligopoly markets. The existing literature on strategic analysis of firms' technology licensing behavior mainly concentrates on unilateral technology licensing, and rely on two types of innovations, i.e., the cost-reducing and quality-improving innovations. There exists wide literature studying licensing strategies of cost-reducing technologies from various perspectives, namely, the perspective of different market structures (Arrow, 1962; Katz & Shapiro, 1985, 1986), the perspective of competition mode (Kabiraj, 2004, 2005; Erkal, 2005; Filippini, 2005; Mukherjee & Pennings, 2006; Bagchi & Mukherjee, 2014), the perspective of information structure (Gallini & Wright, 1990; Macho-Stadler, Martinez-Giralt & Perez-Castrillo, 1996; Beggs, 1992; Choi, 2001; Poddar & Sinha, 2004; Sen, 2005; Crama, Reyck & Degraeve, 2008), etc. Assuming that the market structure, competition mode and information structure are the same, there is also literature studying the question from many other perspectives such as product differentiation (Kamien & Tauman, 1986, 2002; Muto, 1993; Wang, 1998, 2002), simulated costs (Rockett, 1990; Mukherjee & Balasubramanian, 2001), firms' bargaining power (Tombak, 2003), network externality (Lin & Kulatilaka, 2006; Zhao, Chen, Hong & Liu, 2014), mixed economy (Chen, Yang, Wang, & Wu, 2014), risk of R & D (Zhang, Wang, Qing & Hong, 2016), etc. These papers conduct in-depth studies on the licensing strategies of cost-reducing innovation technologies in terms of various key factors. However, their assumption of a perfectly monopolized technology market does not always correspond to the reality, which means that the conclusions they draw are probably not robust.

There are relatively few studies on the licensing strategy issue of quality-improving innovations. Despite that, both intuitively and as shown in empirical studies (Lunn, 1987; Petsas & Giannikos, 2005), quality-improving innovations (or product innovations) seem to be mainstream in quite a few industries, and, unlike cost-reducing innovations, they can directly influence consumers' preferences and their willingness to purchase a product as well as licensing strategies of quality-improving innovation technologies in some cases. Assuming different utility functions, Stamatopoulos and Tauman (2008) as well as Li and Wang (2010) study the licensing strategies of external innovators. They all draw the conclusion that the royalty licensing strategy is optimal in the case of non-exclusive licensing. Their conclusion also proves to be consistent with the conclusion drawn by Li and Song (2009) in their study on the licensing strategies of incumbent innovators, namely, that consumers prefer high-quality products, and it is more efficient to license new technologies with a higher degree of quality improvement (in comparison to outdated technologies). However, the researchers do not take into account the most critical factor influencing technology licensing, namely, the bargaining power of both parties involved in the licensing. Similarly, just like in the case of cost-reducing process innovations, they assume a perfectly monopolized technology market.

Once a technology market becomes competitive, cost-reducing technology licensing or quality-improving technology licensing turns into one of the forms of firms' licensing game, meaning that cross licensing may occur as well. The earliest study on the strategic analysis of firms' cross licensing was conducted by Fershtman and Kamien (1992) who, from the perspective of firms' R & D, conclude that a complementary technology cross licensing might delay the course of technology R & D by both parties involved in the licensing and further facilitate their tacit collusion. Thus, seen from the perspective of the society, cross licensing may be an obstacle to innovations. Later Eswaran (1994) conducted a strategic analysis of the anti-monopoly and welfare implications of cross licensing. Although his analysis was from the perspective of the firms' production and he made an assumption about alternative patented technologies different from that made by Fershtman and Kamien (1992), he nevertheless also believed that firms' cross licensing might facilitate their collusion and harm social welfare. Pastor and Sandonis (2002) conducted a comparison between cross licensing and research joint venture (RJV), and pointed out that due to the existence of participants' moral hazard, cross licensing would be superior in terms of operational efficiency. However, as for R & D, the existence of cross licensing would pose an obstacle to the improvement of social welfare. Choi (2010) studied anti-monopoly implications and social welfare impacts of technology cross licensing in the case of a patent litigation, and drew a conclusion basically consistent with that drawn by previous studies on cross licensing, that cross licensing is anti-competitive and harmful to social welfare.

It's not difficult to see that the existing literature analyzing cross licensing from the perspective of the game theory mainly focuses on its anti-monopoly and welfare implications. In the paper we draw a different conclusion. In fact, we show that cross licensing among firms does not always facilitate their collusion and harm social welfare. One of the reasons for the different conclusion is that we assume different competition modes in the product market. In other words, the existing literature on cross licensing assumes that firms engage in price competition. Different from the case of a general product market, in the product market with hi-tech characteristics firms may not frequently engage in price competition. Instead, they more frequently engage in market share (output) competition. The rationality of quantity assumption is discussed in detail by Kreps and Scheinkman (1983), Anderson and Neven (1991), De Fraja (1996), Avenel and Caprice (2006). Thus, as far as product markets based on quantity competition are concerned, the conclusions drawn by the existing literature regarding cross licensing may be not consistent with the reality. In addition, these studies are also constrained by the following irrational assumptions or inadequacies. First, they fail to take into account the likelihood of occurrence of no or unilateral licensing. Apparently, these conditions construct an incentive compatibility constraint to cross licensing among firms. Second, although the existing studies on cross licensing mainly investigate its anti-monopoly and welfare implications, such as the one conducted by Eswaran (1994), they nevertheless assume that the royalty rate of cross licensing is zero (similar to the assumption of fixed zero fees made by Lin (1996) in unilateral licensing). The assumption is too strong and incompatible with the reality. Third, similar to the case of quality-improving innovations in unilateral licensing, cross licensing has also failed to take into account the bargaining power of each party involved in the licensing. Fourth, the existing literature does not compare the impact of cost-reducing and quality-improving innovations on the competition among firms.

Download English Version:

<https://daneshyari.com/en/article/5083221>

Download Persian Version:

<https://daneshyari.com/article/5083221>

[Daneshyari.com](https://daneshyari.com)