



Case Study

Case analysis of imitative innovation in Chinese manufacturing SMEs: Products, features, barriers and competences for transition



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ABSTRACT

Instead of viewing imitation and innovation as two opposite extremes, this research views firms' new product development as a continuous spectrum in which pure imitation at the one end and original innovation at the other. Firms change their position gradually by means of continuous organizational learning and systematic improvement in R&D capability during the imitative innovation process. Novelty and originality of innovations were increased gradually, and finally firms are able to carry out original innovations with good novelty. This case study investigates how the Chinese manufacturing SMEs go through this process. Drawing upon a multiple case study approach, this research in particular addresses the following questions: How do Chinese firms transit from pure imitation to original innovation through imitative innovation? What barriers may firms encounter in each stage of the transition? What competences do firms need to develop in order to make the transition successfully? Through appropriate Chinese manufacturing SMEs design they may improve their innovation capability to enable support to governmental policy making.

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1. Introduction

The sustaining growth of China economy has caught much attention due to its incomparable speed and scale. It is commonly agreed that Chinese firms took a latecomer strategy in technology advancement by accessing the stock of technology of western firms through international trade and acceptance of foreign direct investment (Altenburg, Schmitz, & Stamn, 2008; Hu & Mathews, 2008; Kriz, 2010; Xie & White, 2006). Chinese firms absorb the technological knowledge from foreign partners, imitate the products, exert their advantage of low cost, and thus produce competitive products. This led to Chinese firms' success in global competition and their high manufacturing position in the international value chain.

When latecomer firms move from technology lag to frontier, as suggested by research on East Asian Tigers' experience in technology advancement, they make a strategic shift from imitation to innovation (Hobday, 1995; Hobday, Rush, & Bessant, 2004; Hu & Mathews, 2008; Kim & Nelson, 2000; Mathews, 2002; Yamamura, Sonobe, & Otsuka, 2005). This happens both at national and firm levels. Macro level data reveal that China is ongoing the same

process. Hu and Mathews (2008) find that China's national innovative capability, measured by patent rates, increased significantly since 2001; this echoes OECD's report (2007) that private sector value added production in China risen from below 30 percent to over 50 percent from 1998 to 2003, and high tech products in China's exports increased from 5 percent to over 30 percent from early 1990s to 2005. The Global Innovation Index (Dutta, 2009) also recognizes that China is the second highest R&D investor only behind the US.

A number of researches were conducted to explore the transition from imitation to innovation in China from institutional and policy perspectives (Dobson & Safarian, 2008; Hu & Mathews, 2008; Tang & Hussler, 2011; Xie & White, 2006). At firm level researchers are more interested in comparing the performance of the two strategies (Liu, 2011; Zhou, 2006), and organizational learning during imitation (Chen & Qu, 2003; Minagawa, Trott, & Hoecht, 2007; Xie, 2004; Xie & Wu, 2003). There are however limited empirical research focusing on the mechanism and operation process of imitative innovation (Huang, Chou, & Lee, 2010).

Instead of viewing imitation and innovation as two opposite extremes, this research regards firms' innovation capability as a continuous spectrum in which pure imitation at the one end and original innovation at the other. Firms change their position gradually by means of continuous organizational learning and systematic improvement in R&D and technology capability. The novelty and

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originality in their innovations was increased step by step, and finally firms are able to create original innovations with good product novelty. We investigate the following issues: How do Chinese firms transit from pure imitation to original innovation through imitative innovation? What barriers may firms encounter in each stage of the transition? What are the drivers pushing firms changing their position in the imitation–innovation spectrum and what competence firms need to develop in order to make the transition successfully?

In particular, this case research focuses on small and middle sized enterprises (SMEs) in manufacturing industry. SMEs play very important role in the economy and technology development in China. It was reported that 60 percent of GDP, 65 percent of invention patents and 74 percent of technological innovation were contributed by SMEs in 2010 (Zhou, 2011). However in management research on Chinese innovation activities, data mainly come from successful multinational firms like Huawei, Lenovo, TCL, Haier, ZTE, etc. as a result of their remarkable international expansion and performance (Fan, 2006; Teagarden & Cai, 2009). To a certain extent, Chinese SMEs are neglected in innovation management literatures. This research draws on case study approach and investigated the experience of five manufacturing SMEs that grew from small imitative workshop to competitive players with strong innovation capability and well-known brands. We seek to better understand the process by which SMEs move from pure imitation to original innovation.

2. Innovation, imitation and novelty

It is difficult to find a common accepted definition of innovation and imitation due to the big diversity of innovation research in terms of characteristics, contexts, technologies, products, markets and industries. The only feature in common in the various definitions is that innovation implies novelty and imitation refers to replication.

Imitative innovation is not imitation. Imitation simply refers to replication and does not produce novelty to the market, while imitative innovation creates novelty. It is the activity that firms develop new products or improve existing products on the base of the innovation of other firms by adding new functionality, improving quality or lowering cost. Imitative innovation is generally incremental innovation (Garcia & Calantone, 2002). The existing products in the market serve as references for the imitative innovation, and provide the prototype for further development. Imitative innovation is a process of 'learning by watching' (Bolton, 1993) and often engineering projects of absorbing new technology from overseas (Kim & Nelson, 2000). Imitative innovators are often followers of a new technology/product in its late stage of the diffusion life cycle.

The role imitative innovation plays in market competition should not be undervalued. Innovative imitators may create strong impact and significantly change to the market direction. "If an innovator does not move quickly, and keep moving, the early imitators can play a major role in remaking or creatively destroying the market. Moreover, if they have more resources and already have a large market share, it is their imitative reactions that will have the most impact on changing the market and the rate of change and competitive dynamics in the market" (Dickson, 1992, p.77).

As the products already exist in the market, imitative innovators take less risk (Lieberman & Montgomery, 1998). Being a fast follower is a more reliable strategy with cost and risk minimization advantage than being a first mover or creative innovator leading the market (Bolton, 1993). By analyzing the product performance in pharmaceutical industry, Shankar, Carpenter, and Krishnamurthi (1998) find that creative followers grow faster than the leading innovators. The late follow-up movement slows down the first

movers' market diffusion and consequently leads to a improved market position. Timing of imitative innovation is also of importance. It is found that fast followers grow faster than first innovators and also mature-stage entrants, and are more likely to have better performance than the first innovators (De Carolis, 2003). In contrast, mature-stage entrants grow slowly and face a poor market response to their product improvement and marketing spending and thus are the most disadvantaged compared to the first innovators and fast followers.

3. Product features, barriers and competence for transition

Product features in different stages of imitative innovation is one of our interests, however there are very limited existing research on this point. Many Chinese manufacturing SMEs start from family based factories with weak technological capability, and at the early stage of imitative innovation, their products are simple and rough with poor machining precision. Sometimes the products just look like the innovation being imitated but big gap in quality exists. Later firms improve their technology capability during the imitative innovation and consequently improve product quality.

Firms taking imitative innovation strategy may encounter some practical barriers and problems as a result of the special properties of imitative innovation. Four categories of concerns are identified from literatures. Firstly, IP infringement is a challenging and sensitive issue for imitative innovation (Huang et al., 2010). Fischer (1978) suggests that the biggest challenge for imitators in a sound legal environment is to overcome the obstacles imposed by patent system. Based on a discussion on the cumulative nature of technology, Mukoyama (2003) believes imitation is a universal and inevitable phenomenon that firms start up by imitation and develop new technology based on the knowledge they learned from others; the risk of IP infringement affects the incentives of learning and impairs the next round of innovation.

Secondly, firms taking imitative innovation strategy need to have solid R&D and technology capability to redesign and produce products equivalent to or surpassing the original products being imitated which often already have a first-mover position in the market (Schewe, 1996). Leading innovator sometimes purposely block their core technology by some 'anti-imitation' design such as encrypted chip, hidden or vide functions, etc. This increases the difficulty of imitative innovation.

Thirdly, asymmetrical information may present a challenge for imitative innovators to follow up. Innovation is the consequence of the match of demands and supplies, between which information serves as the bridge. Levitt (1966) believes the capability of information acquisition is critical for innovation. Inability in information collection, analysis or interpretation will lead to poor performance in market competition. For the purpose of imitative innovation, firms need to identify the target product to be imitated, gather products and market information, and understand the competition. Schewe (1996) found that the success of imitation is significantly positively related to firms' continuous tracking of technology information in the market. Due to weak financial and intelligent resources, SMEs generally have less external linkages and weak judgment on technology trend and market potential of a new product.

Fourthly, timing of market entry is difficult decision for imitators. Timing decision needs to take consideration of many factors of uncertainty, e.g. stability and maturity of the technology, potential profits, market growth, competition from other imitators, etc. (Reinganum, 1989). Firms also need to properly self-evaluate their strength and weakness, financial and technological resources, etc. (Fu, 1998). Shankar et al. (1998) and De Carolis (2003) find that entry timing significantly affects imitators' market performance. It

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