

SHUANPING DAI

EMERGENCE OF NEW PRODUCTS AND AGILE PRODUCTION INNOVATION CONJUNCTURE: EVIDENCE FROM LOW-SPEED ELECTRIC VEHICLE INDUSTRY IN SHANDONG PROVINCE, CHINA

Introduction

This research is motivated by the recent development of the low speed electric vehicle (EV) industry in Shandong province of China where little automobile industry knowledge accumulation has been before, and proposes an agile production innovation (API) model that specifies a transition process from imitation to independent innovation and stresses on the role of interactive process between firm's (un)productive behavior and industrial policies in emerging economies.

Low-speed EVs in Shandong Province

The low-speed EVs industry in Shandong becomes a phenomenal new product approach because of the impressive growth in a grey market (see Table) and its extraordinary production upgrading process (see Figures).

Agile Production Innovation (API) Conjecture

1. Flexible products

- Combining accessible components for the purpose
- Incumbent firms rarely adopted same technologies and developed similar products
- The catching-up firms "were adopting activities rarely displayed by their competitors, whereas other upgrades comprised functions that were widespread in the industry" (Pipkin & Fuentes 2017: 538)

2. Openness

- Cooperating with every possible partners at the beginning, later, they start to only cooperate with the companies that have advanced technologies, but still very open
- Openness provides faster way to develop new products

3. Targeting margin market

- Access to the certain group of consumer, based on its existing marketing recourses. For example E-bike to E-car
- Profitability for survival. For example 6 % sale to R&D in BYVin
- Some firms will only focus on this group of consumers. For example, Lichi will focus on the low-speed EVs, BYVin will not

4. Flexible regulation

- Central government pays attention to that, but never stops
- Local governments actively react to central government's inquires, and strategically support local firms
- "Shadow Government"

Conclusion

The development of Shandong's low-speed EV industry provides a new perspective for understanding the emergence of new industrial products (small new firms, new networks, targeted market). The API model may help us to understand how China's firms catch up and cultivate their innovation capacity in some special fields.

Table:

Low-speed EVs produced in Shandong

Year	Production Amount	Growth Rate
2010	18,200	
2011	64,200	252 %
2012	83,300	29.76 %
2013	121,400	45.74 %
2014	187,400	54.36 %
2015	347,000	85.17 %
2016	622,600	79.42 %
2017	756,000	21.43 %

Data Source: Shandong Automotive Industry Yearbook



Figure:
The production upgrading of BYVin

