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## THE APPLICATION OF SHANZHAI INNOVATION MODEL IN CHINA : THE EXAMPLES OF MOBILE PHONE, NOTEBOOK COMPUTER, AND AUTOMOBILE

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### Abstract:

How do small emerging-market late-entrants with weak capabilities and scarce resources overtake leading U. S. and European firms in emerging markets? To answer this question, this study investigates Chinese Shanzhai firms in mobile phone, automobile, and notebook PC through secondary data, firm interviews, and retail channel observation. The result of this study not only helps understand the Shanzhai innovation model but extends the theory of vertical alliance and provides other aspiring emerging-market new entrants a framework for devising winning innovation strategies.

This study finds three key elements to the rapid and steady rise of the Chinese Shanzhai firms, i.e. value activity restructuring, vertical alliance, and market testing. First of all, these firms restructure existing value activities and develop a unique new value network in marginal areas of the existing industrial system. Secondly, they build up vertical alliances to leverage each other's core competences and jointly engage in innovation to make up for what they lack as they fight for survival. Lastly, they launch a series of market testing to quickly respond to the needs of a dynamic, fluid niche market with a range of diverse, high price-to-performance products, and then gradually infiltrate into the mainstream market.

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*Keywords: Innovation, Shanzhai, value activity restructuring, vertical alliance, market testing*

## 1. Introduction

With the economic slowdown in Europe and the United States, financial crisis, higher per capita income in Asia, and more sophisticated industrial systems, emerging markets such as Mainland China have become the major competitor for companies around the globe. However, large international companies' competitive edge in technological innovation is not without its drawbacks. Besides local brand companies' local advantage against the advantage of their technical superiority (Bhattacharya and Michael, 2008), they are also faced with competition of varying degrees, depending on the level of industrial system development of the particular country they are in. For instance, the overall market shares of international companies from Europe, the United States, and Japan in the Chinese market dropped from over 90% in 2000 to under 50% due to competitions from local brands and Shanzhai. Meanwhile, Nokia, the company that dominates the Chinese and Indian mobile phone markets has a 60% market share in India, but less than 30% in China. The key to this difference lies in differences in degree of industrial system development, resulting in varied market competition conditions.

In recent years, through the "simple/minimal/optimal" Shanzhai model, small local companies have dominated the local market and replaced the local brands under active government promotion. The products have been exported to India, Southeast Asia, and other emerging markets, making MediaTek Inc. one of the world's top 5 IC design companies and resulting in the rapid development of the "Shanzhai model" in other sectors. Many firms now attach great importance to the challenges and underlying business opportunities ahead. The Chinese government even changed from initially rejecting the idea into positioning it as the "primary innovation" for late-entry countries.

So, is "Shanzhai Model" a speculative bubble from the underground economy of the emerging markets or is it a unique and innovative business model or a competitor that deserves firms' attention? Most people raise questions over its sustainability because of the copying, illegality, and hit-and-run nature of the model. However, for more than four years since its development (specifically since the emergence of Shanzhai phones in the Chinese mobile phone market in 2005), there has been considerable increase in market share (i.e., over 30% market share in 2008). In view of some firms' successful transformation into the leading local brands (such as Tianyu,

Beijing) and the model's interdisciplinary applications (T.V., notebook computer, automotive, T.V. programs), etc., analyzing Shangzhai firms' innovations in their development strategies will perhaps help solve the puzzle of their competitiveness.

In this paper, Shanzhai is defined as a model in which firms integrate internal and external resources flexibly through vertical alliances and value activity restructuring and make whatever trade-offs necessary (product functionality, quality, IPR, branding, taxes etc.) to bring down cost or increase customer perceived value by delivering higher price-to-performance ratios, which allows them to launch a broad range of products quickly for market testing and identify otherwise inaccessible customer segments (due to income, geographical, and timing constraints), and then gather consumer feedback to make rapid adjustments to product design in order to win in the "good-enough segment" and to generate revenue.

In view of the practical implications, this study is expected to shape two dimensions of cost reduction capability (enabled through increased price-to-performance ratios) and the speed of market response through interviews with mid- and down- stream mobile phone firms in the Greater China Region in order to analyze the strategic innovations of Shanzhai mobile phone firms in Mainland China and the sustainability of the model.

Theoretically, existing literature focuses mainly on firms with abundant resources and capabilities and discusses process innovation (Abernathy & Utterback, 1978, 2004) and complementary assets (Teece, 1986, 2006). Based on the value network perspective, Christensen & Rosenbloom (1995) described how attackers with seemingly inferior technology defeat the leading firms. But their focus was mainly on how leading firms tended to choose existing major clients over the opportunity to invest in the latest technology and how attackers were able to succeed because market leaders had failed. Therefore, the focus lies in resolving the established firms' management agendas in response to disruptive innovation while case examples and the attackers' framework of thought are relatively scarce.

Therefore, the innovative business model for attackers of emerging countries shall serve as basis in exploring the attackers with scarce resources and capabilities and how they surpass the first movers in the emerging market. In turn, the PFI of Teece (1986, 2006), disruptive innovation of Christensen (1995, 1997, 2003, 2004), and the victory of the attackers framework will be elaborated. The key to the first movers' success are further discussed as basis for developing a reference framework for attackers as they

develop business model innovations.

## **2. Literature Review**

### **2.1 Attacker's Advantage**

How to win in competitions has always been a question of concern in the field of strategic innovation. Back then, numerous scholars asserted on the competitive edge of the first movers based on the sequence of their entry into the market. On the other hand, Aveni (1994) believes that both the first movers and second movers each have their own advantages. Tellis and Golder (2002) believe that the first movers' advantage related researches are flawed. Teece (2006) believes that the network capability entitles the first movers to absolute competitive advantage although it is a rare occurrence. Obviously, the sequence of entry into the market does not determine the success or failure of a firm.

Pisano and Teece (2007) exert that the market bottleneck that determines defeat or victory in a competition changes over time. In other words, the key to competition varies with market development stages. Moore (1991) incorporates the consumer concepts into the product life cycle theory to explain why key to competition changes over time. In the different stages of market development, the business strategies are subject to adjustment from product function to quality and then pricing. Abernathy and Utterback (1978, 2004) emphasize that the nature of innovation changed from product innovation to process innovation following the emergence of a dominant design. The competition basis transformed from product function to product differences, suitability, and prices.

Teece (1986) stressed that the crucial resources transformed from technological innovation into complementary assets as key to competition changed from technological innovation into prices. The PFI framework (Teece, 2006) includes discussions of the reasons technologically innovative firms are unable to derive profits from one single type of technology based on three dimensions including: time of market entry, non-rival assets, and complementary assets. It implies that the shift of competition focus across different industrial development stages, the technological knowledge dissemination, the weak intellectual property right protection, and the lack of complementary assets including production and marketing capabilities required for commercializing products will result in profits flowing to the competitor, supplier, distributor, or customer.

## 2.2 Chance of Attacker with weak resource and capabilities

Do attackers with weak resources and capabilities stand a chance in surpassing the first movers?

Henderson & Clark (1990) discovered through empirical studies of the semiconductor and photolithography equipment industry that architectural knowledge is often embedded in the organizational structure, information processing procedures, etc., in which its disruptive power cannot be detected and corrected by the established firms or incumbents, thereby giving rise to the subtle challenges and a significant impact on competitiveness.

Christensen & Rosenbloom (1995) compiled related researches on the relative advantage of firms with the latest technology as compared to the established firms. Based on the interpretation basis of technical capabilities and organizational dynamics, through research on the technical development in the hard disk drive industry, the value network (value network is the environment of the company whereby it competes with other firms and offers solutions to clients) is proposed. They believe that when attackers' technology meets the demand of different users in the emerging value network and destroys the existing market technological trajectory, they then create the so-called "attacker's advantage". This viewpoint elaborates on how the attackers with weakened assets and technology manage to lead in the emerging market by taking advantages of organizational rigidity of the established firms.

From Christensen's "disruptive innovation" viewpoint based on research of the hard disk drive industry in the early period, it is found that the established firms chose the existing major clients over the opportunity to invest in the seemingly inferior, but potentially promising, emerging technology and thereby giving it up to the attackers (Christensen & Bower, 1996).

However, if we reexamine the disruptive innovation related researches, we will rediscover how the attackers with weaker resources and capabilities surpass the first movers. First of all, the root cause of this is an error in market selection and forecast, resulting in wrong technological investment. Based on the view that established firms tend to ignore new technologies due to their key customer-oriented organization setup and decision-making mechanism that allows the new technology to grow and take over the mainstream market with low price (Bower & Christensen, 1995; Christensen et al., 2001), overemphasis on the existing mainstream customers and dismissal of

promising emerging markets without solid market forecasts may be the cause for their abandoning of the seemingly inferior technology. On the other hand, first movers' wrong market selection is probably due to the vague and dynamic characteristics of the emerging market, leading to their failure to detect changes in demand and the existence of the overshoot, restricted emerging market, consequently resulting in the first movers' procedural failure (Christensen et al., 2004).

Secondly, attackers challenge first movers that excel in technological innovation with their low-cost business model. The attackers conduct different forms of market testing through Darwinian selection (developing and releasing multiple product models for consumer selection), product ecology (adjusting products in stages with technological advancement and consumer demand), surrogate experiment (observing the factors that contribute to the success or failure of competitors to serve as basis for product development), etc. (Dorothy, 1995) Through the grass-roots model (Lee, 1992) and through organization members' learning ability and support of organization resources, the market demands gradually (sometimes unexpectedly) revealed. Along with the "think it and do it" approach (Mintzberg, 1987), corrections and adjustments were made (Johnson et al., 2008). Therefore, attackers normally do not have specific marketing strategies during initial sales; instead, they tended to search for a market where they did not have to compete head-to-head with existing technologies (Christensen et al., 2001). A small but fast trial and error model was adopted to cope with the risks involved and the uncertainties while searching for mainstream applications (Christensen & Bower, 1996; Christensen et al., 2003; Prahalad, 2005; Anthony et al., 2008). Thus, as technological innovation gradually increased beyond consumers' demand for product functions, coupled with growing cases of successful non-technological innovations, the intrinsic content of disruptive innovation extended from technology to business models (Christensen & Overdorf, 2000; Christensen et al., 2001; Christensen, 2003; Johnson et al., 2008; Anthony et al., 2008).

Furthermore, value network integration is the key capability of disruptive innovation. Christensen et al. (2003) mentioned the "less well-integrated areas" when discussing the six keys to disruptive innovation and suggested that the less well-integrated activities be internalized to extend focus to the co-operation network. Anthony et al. (2008) further pointed out that companies in search of innovation cannot succeed on their own but learn from merits of other companies along with their own in order to create

“value” for partners of mutual interest. It shows that behind the low-cost and long-tail product experimentation, disruptive innovators actually rely on integrating resources outside the organization to construct their own value network during early business development when they were still small in size and relatively scarce in resources.

### **2.3 Attacker’s Advantage in Relevant Markets**

How can attackers in emerging countries win in relevant markets?

Bhattacharya & Michael (2008) analyzed over 10 emerging countries including Brazil, China, India, Indonesia, Malaysia, Mexico, Poland, Russia, Slovakia, and Thailand and 50 cases of domestic winners that are able to compete with foreign firms or lead in the domestic market. In consideration to the question of “How can attackers surpass first movers in relevant markets?”, 7 winning strategies have been proposed including: use of low-cost labor, being equipped with the most advanced technology, establishment of management skills, development of local business models, provision of customized products or services, and rapid expansion of scale.

Zeng & Williamson (2008) explored the “Made in China’s Future Development Path”. Through long-term analysis of Chinese cases across industries, it is found that firms reduce costs through innovation. They believe that firms and countries convert more favorable resources into competitive advantage by innovative means. Under confines of the R&D and education system, it will take time for Chinese firms to achieve breakthroughs in originality and basic R&D. Therefore, innovation is realized through cost reduction (application-oriented). The successful Chinese firms are categorized into: architectural innovation/niche market (Haier), pressure principles (Huawei), process innovation (BYD), and merger/economies of scale (Shanghai CIMC Generating Set Co., Ltd.)

Kim (1997) on the other hand engaged in long-term research of technology improvements of automotives, consumption electronics, and semiconductor firms in South Korea. Viewpoints in the four stages including preparation, absorption, imitation, and enhancement are also proposed to analyze the technological development process of South Korea from imitation to innovation.

### **2.4 Contributions and Gaps in the Existing Theory**

The PFI framework of Teece (1986, 2006) is an explanation of the opportunities the attackers have to surpass the first movers from

technological innovation perspectives of the U.S. and European first movers and based on factors such as development stage, specialization, and complementary assets. Christensen's viewpoint (1995, 1997, 2003, and 2004) on the value network and disruptive innovation from the first movers' perspectives and based on factors such as supply network and customer value explains how the first movers ignore investment in new technology due to their concern for the demand of their existing customers. This gave the attackers in the "good enough" but constrained secondary market a chance to flourish. Importance is also attached to the attackers' surpassing the first movers by not only technological innovation but innovation in business models as well. Bhattacharya & Michael (2008), Zeng & Williamson (2008), and Kim (1997) focused on analysis of technological innovation, innovative strategies, and innovation types of attackers in emerging countries and strengthened research on innovative business models of attackers in emerging countries.

However, the existing literature generally attributes the success of attackers to the failure of first movers. First movers' failure to cultivate process capabilities (Abernathy & Utterback, 1978, 2004), inability to secure technological appropriability, lack of complementary assets required for commercialization (Teece, 1986, 2006), restrictions of sunk costs (Richard A. D'Aveni, 1994), or limitations in investment decision making due to considerations of the existing mainstream customers (Christensen & Rosenbloom, 1995) gave the attackers the chance to flourish. Although we know the reasons that contribute to the first movers' failure, we are unable to find out the secret to the innovative attackers' success. Just as Jacobides, Knudsen and Augier (2006) mentioned, in order for firms to derive profits, other than taking appropriability of value into consideration, the creation of value is also worth noting. Also, Teece et al. (1997) believe that in terms of privately owned resource creation, discovering new opportunities and efficient and effective organization to seize the opportunities are of fundamental importance rather than engaging in strategies that cause competitors to lose balance or increase costs, or barricading newcomers. In order for attackers to surpass the first movers, it takes more than beating the opponent that has made mistakes in the competition; it is the innovative business model that has created higher values for the customers. Therefore, in order to find answers to the outcomes, we must first review what mistakes the first mover has made and analyze what the attacker has done right.

In addition, Teece's PFI (1986, 2006), Christensen's disruptive innovation

(1995, 1997, 2003, 2004), and the victory of attackers' in emerging countries and related literature mostly focus on the organizational level rather than analysis on industrial level. Most of them interpret the success of the attackers from the internal organization perspectives. And analysis on attackers' good use of the industrial system despite their lack of resources and capabilities is not much covered.

### **3. Methodology**

#### **3.1 Research Subject**

Although the so-called Shanzhai model has been under development for a very long time, it did not catch much attention until it was widely adopted by China's mobile phone players.

The reason is mainly that after Shanzhai business model became relatively established in 2005, the local market share of Shanzhai firms continued to increase with no sign of slowing down and their products are continuing to be exported to other emerging markets. At the same time, although many industries were eliminated in the market competition, there are quite a few that have been in business for quite sometime and are gradually transforming into brand firms. Moreover, the development model in cross-industry applications was already in full swing.

In addition, if we further analyze its development strategy, we may find that the competitiveness not just comes from illegal counterfeiting, but also collective innovation across firms within the industry to explore the unique needs of consumers. And this cross-industry model extends from the mobile phone industry to the automobile, notebook computer, flat-screen TV, TV program industries. Therefore, Shanzhai firms of mobile phones, automobiles, and laptop computers in China have been selected as the research subjects.

#### **3.2 Data Collection Method**

The main purpose of this study is to explore the attackers in emerging countries that are seemingly counterfeiting and lack innovation by analyzing the development strategies of Shanzhai mobile phone players in Mainland China to understand why they grow year after year. Since analysis on the development of the underground economies of developing countries is involved, in the absence of credible information, the study has established its research validity through three different data (Yin, 1989).

First of all, secondary data, media reports, and related reports of

companies and research institutions were collected to gain a preliminary understanding of the industrial environment, market development status, and strategies and actions of firms. Secondly, in order to overcome factors such as Shanzhai firms' covert action, concealed information, and differed strategic types, and to avoid bias or "taking a part for the whole" from a single source of information, the researcher scheduled interviews in Beijing, Shanghai, and Shenzhen in China for a period of one week to half a month in June 2007, November 2008, September 2009, and October 2009 and conducted telephone interviews simultaneously. Presidents, GMs, R&D VPs, sales VPs, and marketing managers of 55 enterprises and institutions including 94 component manufacturers, design centers, assembly manufacturers, retailers, think tanks, and private equity firms were interviewed (136 interviews). Each interview lasted 0.5~3hours. Targeting the respondents' job title and area of specialty, the respondents' viewpoint on the Shanzhai firms' development strategies was obtained through dialogues between the researcher and respondent. Through Shanzhai firms' business conducts with the upstream component firms, design centers, and downstream marketing channels, the respondents' viewpoints were verified and integrated. Finally, through site survey of the market channels and understanding of the product types and trading behavior, the accuracy of the secondary data and interview content was confirmed.

Table 1 Overview of interviews with experts in the notebook industry

Company Type	Name of Company	Job Title of Respondents	Interview method	No. of interviews
Semiconductor Firms	T	Ex-Assistant to the Chairman, Asia Pacific Sales Vice General Manager (x2), Public Relationship Manager in Mainland China, Senior Sales Manager, Sales Specialist (x2)	Interviewing	7
Notebook Computer Firms	D	Vice General Manager	Interviewing	1
	C	Marketing Director	Interviewing	1
	F	Vice General Manager	Interviewing	1
	Q	President, General Manager, R & D Manager	Interviewing	3
Research Unit	E	Director	Interviewing	2

Table 2 Overview of interviews with experts in mobile phone industry

Company Type	Name of Company	Job Title of Respondents	Interview method	No. of interviews
Mobile Phone Chip Firms	K	Taiwan Public Relationship, Manager	Interviewing, Telephone	3
	G	Asian Sales Director, General Manager (Mainland China), General Manager (Business Division in Mainland China)/ Key Account Manager, Marketing Manager (Mainland China)	Interviewing, Telephone, E-mail	12
	Q	Marketing Director, Marketing Manager	Interviewing	2
	N	Ex-Marketing Manager	Telephone	1
	A	Vice Chairman (R & D, Mainland China)	Interviewing	1
	T	Ex-General Manager	Interviewing, Telephone	5
Mobile Phone Design Center	7	Marketing Director	Interviewing	2
	J1	Marketing Director, Manager	Interviewing	3
	E	Vice Chairman (R & D), Marketing Manager	Interviewing	4
	A	Director (R & D)	Interviewing	2
	Q	General Manager (R & D), Marketing Director	Interviewing	4
	C	General Manager (R & D)	Interviewing	1
Mobile Phone Firms	J2	General Manager (R & D)	Interviewing	1
	Y	Senior Vice General Manager (R & D)	Interviewing	5
	Z	Project Manager (Sales)	Interviewing	1
	N	General Manager (Logistics)	Interviewing	1
Retailers	R	Marketing Director (Market)	Interviewing	1
	R1	Assistant to Employer (Mobile Phone Channel Sales)	Interviewing	2
	R2	Employer (Small Parts Access Sales)	Interviewing	1
	R3	General Manager (New Channel Sales)	Interviewing	1
Private Equity Firms	X	Vice General Manager (Nationwide Agents Survey)	Interviewing	1
	D	Vice Chairman (ex-mobile factory R & D Vice General Manager, Chip Manufacturer Marketing Vice General Manager)	Interviewing	1
Think-Tank	H	Division Manager	Interviewing	2

Table 3 Overview of interviews with experts in the automobile industry

Company Type	Name of Company	Job Title of Respondents	Interview method	No. of interviews
Automobile Firms	C1	Special Assistant to the General Manager, Manager (Procurement), Manager (Overseas Procurement)	Interviewing	4
	C2	Director (Procurement), Manager (Procurement)	Interviewing	2
	C3	Vice Chairman (Procurement), Director (Procurement), Manager	Interviewing	3
	C4	Director (Manufacturing), Vice Director (Finance)	Interviewing	3
	C5	Manager (Sales)	Interviewing	1
Automobile Parts and Components	D1	Director (Manufacturing), Section Manager (Manufacturing)	Interviewing	2
	D2	Manager (Sales)	Interviewing	1
	D3	General Manager	Interviewing	1
	D4	General Manager	Interviewing	1
	D5	General Manager	Interviewing	1
	D6	Vice General Manager	Interviewing	1
Engine Electronics	E1	General Manager, Manager (Marketing and Sales), Project Manager	Interviewing Telephone	7
Car Body Electronics/Safety and Security Electronics	F1	Project Manager (Sales)	Interviewing	2
	F2	General Manager (Automobile Electronic Business Division), Operation Director (Sales), Specialist (Marketing)	Interviewing	4
	F3	President	Interviewing	1
	F4	Vice General Manager (Marketing and Sales), Senior Project Manager	Interviewing Telephone	3
	F5	Director(Technical),Manager (Manufacture)	Interviewing	2
Information/Recreation System	G1	Director (Marketing and Sales)	Interviewing	1
	G2	President, Executive General Manager (Mainland China), Vice General Manager (Marketing), Director (Administrative Management), Manager (Finance), Project Manager	Interviewing	7
	G3	Deputy Manager (Sales)	Interviewing	3
Electronic Components	H1	Manager (Technical Marketing), Deputy Manager (Technical Marketing), Vice Director, Assistant manager (Sales)	Interviewing	4
	H2	Director, Strategic Analyst	Interviewing	3
Research Institutions	I1	Vice Director General, Vice Director (Mainland Business)	Interviewing	1
	I2	Manager	Interviewing	1
	I3	Sales Team Leader	Interviewing	3
	I4	Division Manager, Section Manager	Interviewing	2

### 3.3 Data Analysis

In terms of analysis, this study focuses on industry in order to enhance the practical application value (Crowston & Myers, 2004; Chiasson & Davidson, 2005).

Through professional market research firms' survey method and analysis of the Chinese phone/component market, we can see that there has been a growth in market share of Shanzhai firms in Mainland China. Based on secondary data such as company information and media reports and interviews with firms, the product line in terms of product variety, quantity, retail price etc., of Shanzhai firms explains their higher market share (i.e. more product varieties, lower retail prices). Furthermore, through interviews with the upstream/downstream rivals in the industry and through field observations of sales channels, the Shanzhai firms' innovative business model from external products, prices, channel strategies, to internal organization, production, R&D, financial strategies, etc., are cross-validated and the sources of their competitive strength are further discussed.

## 4 Research Findings

### 4.1 The Rise of MediaTek and Shanzhai Phone

The mobile phone market experienced a growth from 1994 to 1999 and a peak after 2000. The competitive situation turned from being dominated by a few European and American leading brands to the sharing of the market by emerging manufacturers from South Korea and Taiwan. In addition to call-quality requirements, personal portable communication devices also incorporate consumer electronics features in pursuit of personalization. Generally speaking, most consumers take appearance, price and brand into consideration when buying the product. Firms usually classify their products by consumption pattern into 3 categories including business, product function, and basics and endeavor to pursue product innovations in such areas as appearance (structure and color) and function (software, hardware). By the end of the 1990s, Mainland China became the world's largest mobile phone market, which ignited the price war among American and European firms in the higher income urban areas.

#### (1) Pursuit of Industrial Periphery

As the mobile phone chipmaker, MediaTek, was not favored with many orders by mobile phone firms in Taiwan and Mainland China, it resorted in

2005 to using the abundant cross-strait mobile phone design talents to introduce a complete mobile phone product including hardware and software reference design. Meanwhile, the Chinese government relaxed the licensing control policy, which weakened the barriers to mobile phone R&D and enabled mobile phone firms to introduce more diversified products in a shorter period of time in response to market demand. The shrinking R&D added-value and the transparent cost also made other outsourced designers start incorporating their own design and with very flexible model of management rapidly drove another wave of changes in the mobile phone market in China.

In 2005, a new group of mobile phone firms emerged in Mainland China. Through the diversified specifications, the manufacturers of cost-effective (high performance-price ratio) mobile phones explored the particular needs of the market periphery. Because it provided various products ranging from counterfeit, imitation, different levels of product certification, to cover the wide concepts, the media in 2008 renamed it the “Shanzhai phone” from the “tainted phone”.

## (2) Business Model Innovation to Create Competitive Advantage

The business model innovation is the reason why Shanzhai mobile phone firms are able to quickly introduce diversified and cost-effective mobile phones. First, instead of a subjective conjecture, it is a “rapid test.” Much money was spent in Shenzhen to buy cost-effective products from distribution companies and to spread the low-cost, high-profit, and uniquely featured product to the niche market of rural areas. “The countryside surrounding the city” became the competitive strategy in the early stages of developing Shanzhai phone firms to avoid direct conflict with leading manufacturers, quietly accumulate funds, and gain needed space-time for growth. Meanwhile, based on the mainstream specification design of the mobile phone provided by chip manufacturers, making adjustment of function and appearance in response to market conditions, Shanzhai phone firms not only make good use of the R&D and production energy in the industrial system, but also seek to develop the product appearance design team. Distribution channels thus became key resources for Shanzhai phone firms to develop the niche market. A Shanzhai phone manufacturer revealed that the advantageous display position, enhanced marketing, and customers’ feedback are greatly related to the sales outcome. So, his sales team has to use profit margins and best-selling products as bargaining chips to win the dealers’ advantageous position and payment terms in the marketplace. The sales team must also obtain

consumer's preferences and other vital information, after comprehensive analysis, to provide to R&D and production departments for adjusting design and delivery. As the quality threshold is relatively low, whether it can or cannot compensate for the product's inherent weaknesses through high-quality after-sales service to avoid consumers' complaints reverting to the discontent of the dealers became the key to ensure a continual sales relationship. Through rapid maintenance, alternative mobile phones, swap-in, etc., Shanzhai phone firms opened up a long-term development bottleneck through a rapid after-sales service.

Secondly, the "streamlining of redundancy" has shaped the cost advantage. The chip manufacturer's total solutions, reference design and phone design reduces Shanzhai phone firms' huge R&D costs and greatly improved their market response. By skipping the product certification process, more cost is saved. In the meantime, through the establishment of appearance design capabilities Shanzhai firms are able to develop multiple products using the same design, thereby reducing per-product R&D expenditure. On component sourcing, Shanzhai firms can either acquire components directly from suppliers to avoid paying a price difference to design centers, or purchase readily available components at retail channels on a need basis to save inventory cost. In addition, adopting market-proven mature designs not only avoid maintenance costs resulting from potential defects of a new design but also create economies of scale through bulk purchases of same components by a group of manufacturers. On the manufacturing aspect, the outsourcing production avoids huge depreciation costs of machinery and equipment and avoids waste from leaving the production capacity idle. Various savings in quantity or quality in the parts or functions that consumers are not aware of go beyond the normal routine operations. Management costs are minimized through saving measures of personnel, marketing and finance departments such as a more streamlined organization, small office spaces, removing advertising and marketing, and cash transactions to avoid interest burden and risk of bad debt. As to tax burden, those without production license need not pay associated costs of such policy. Also, they are not pressured by the government to record invoice, so the related tax burden is saved. Worthy of note is that the expenditure of providing retailers high profits cannot be avoided, as the relationship with the retailers is an important key to building the manufacturers' competitive advantage.

Furthermore, "flexible integration" of cross-organizational boundaries plays an important role. The restructured value activities enable the

innovation business model to create completely different benefits from the mainstream manufacturers. For example, MediaTek and other chip manufacturers expanded the business scope to mobile phone software and hardware designs, helping Shanzhai phone firms in R&D. And, moving design activities closer to the market, Shanzhai phone firms created a competitive advantage by having a more rapid response to the changing market situation and reducing stocks. The overall competitive strength of the strategic alliance formed after value activity restructuring has a lot to do with who the firm chooses as strategic partner. Although partners' resources and capacity are essential, resources complementarity on both sides of the strategic alliance also affects the willingness and time of cooperation. The reason why Shanzhai phone firms can be the main cooperation partner of the new manufacturer of mobile phone chipmaker MediaTek is the relatively high complementarity of resources on both sides. Unlike in Mainland China, the local brand mobile phone firms, due to a huge investment in R&D and in consideration of profit allocation, request the mobile phone chip manufacturers not to release the complete mobile phone design. The mobile phone chip manufacturer Spreadtrum under the active support of the Chinese government had given up releasing the mobile phone design in honor of the wishes of mainstream customers including Amoi, thereby losing business model innovation opportunities. Using existing industrial infrastructure greatly influences reduction of operating costs and organizational flexibility. By outsourcing production operations of non-core capabilities, Shanzhai phone firms, in addition to enjoying the same quality and cost as existing mainstream manufacturers, can input the limited resources into professional areas and prevent the organization from a slow response due to overstretching across too many value activities.

#### **4.2 The Tests of VIA GMB and Netbook**

The consumers take specifications and prices as main considerations when purchasing the function-oriented PC. In this highly developed market, the pursuit of economies of scale has led to an increasingly concentrated market with only a handful of leading American firms dominating the market. After firms' transformation and channel reform after 2000, Asus success of EeePC in the small Netbook market rewrote the map of market competition. However, compared to the change of market competition landscape, the change of personal computer industry system is relatively small. Besides Microsoft and Intel, who dominate the hardware and software industry standards

respectively, most parts and components manufacturing and OEM assembly is controlled by Taiwan's IT companies. In the move toward a mature market of mainstream laptops, R&D and assembly production are mainly concentrated in Quanta, Compal, Inventec, Wistron and a few other Taiwanese outsourcing factories. To reduce costs, most related parts and component suppliers set up factories in or near the industrial zone for notebook computer assembly plants in East China.

The fourth quarter of 2008 saw worldwide financial turmoil and talents serving international firms and Taiwanese firms experienced outflows due to pay cuts and layoffs. With the market shrinking, Intel increased the profit margins for small-scale manufacturers and rapidly expanded the design centers of small laptops like Shenzhen Branch Xin Electronic Technology Co., Ltd. and Powerise Cheng Technology Co., Ltd. However, due to a high unit price of notebook personal computers (over US\$250) and their numerous parts (more than 1,200 units), the scale of production and sales of existing assembling companies were large. As the financial and technical thresholds were still high, the related design centers needed a relatively complete platform to compensate for their inadequate R&D capabilities.

#### (1) Vertical Alliance Builds a New Force

To cope with Intel's blockade, VIA joined American Microsoft and various manufacturers at the end of 2008 to set up an open GMB Alliance (VIA Global Mobility Bazaar Alliance). As the technology and capital of notebook computers has a higher threshold than that of mobile phones and a higher degree of industry concentration, VIA provided a complete design and procurement services. First, it provided through cross-strait teams a complete phone reference design to reduce the technical threshold; meanwhile, through the design consultation and modification services, it assisted assembly companies to enhance R&D capabilities. Secondly, the integration of industrial systems and the use of Taiwan's existing industrial system helped obtain 60% of components from VIA's CPU, Jing Yuan's keyboard, TAT battery, Elan's touch pad, Innolux's panel, ITE's IC, etc., for each selected component. Two to three partners were chosen to be authenticated by the GMB to ensure product quality, supply stability and price competitiveness, on behalf of assembly manufacturers negotiated in advance with component manufacturers on the specifications and basic prices. This further assisted the assembly manufacturers to negotiate for the price individually according to the size of the orders. Individual Shanzhai firms could then open the molds for manufacturing.

## (2)The Challenges from All Sides

Holding more than 90% share of the global CPU market, Intel initially took a resolute stance against the Shanzhai firms; but due to the global economic downturn in the latter half of 2008, to scramble down the low-end market, it took to actively fostering Shanzhai firms with relatively distinct size and strength. Since most of its revenue comes from brand manufacturers, to avoid the personal computer price drop from compressing the CPU's profit margins, early in May 2009, Intel officially launched its strict control strategy in Mainland China and no longer accepts small orders.

Besides industry standards being dominant obstacle, Shanzhai firms face challenges of cost, quality, maintenance, value, etc. Firstly, cost reductions like 17% value-added tax savings, lower administrative costs and profit requirements have not achieved economies of scale; the Shanzhai version material costs are still higher than that of the Taiwan brand notebook computers by US\$20~US\$30. Secondly, in quality issues, the design company's technical level remains behind, so manufacturers cut corners for a quick success, leading to inconsistent quality. Also, the lack of pipeline maintenance support of existing parallel goods and the manufacturers' different designs have made the after-sales service another of Shanzhai firms' problems. Furthermore, product function in the value creation is still a key factor in procuring notebook computers. Besides the appearance that plays only a catalytic role in the procurement, finding the play space of added value is another challenge.

## (3)The Re-Start of Exploring Room for Survival

By April 2009, raising the profile of China's own 3G standard TD-SCDMA, China Mobile launched the RMB10 billion subsidy programs for terminal products. To first promote 7 notebook computer models, RMB2100 worth of phone calls, Internet access fees subsidies, and installment payments were provided to conduct sales at the large appliances chain stores of GOME Electrical Appliances Holding, which resulted in removing the price difference between the Shanzhai and the general notebook. By August 2009, Taiwanese media on the theme: "Brand factories large-scale counterattack by means of China Mobile's power – the price advantage vanishes and Shanzhai scatters in all directions", reported that 4 out of 5 Shanzhai counters at the IT marketplace in Shenzhen, Shanghai, and even in Nanjing, Wuhan and other provincial cities made clearance sales and withdrew from the market, and the Shanzhai firms had turned to fight in the game market. Faced with the different features and competitive situation of industries, the cross-industry

applications of Shanzhai model obviously still need much progress.

### 4.3 The Shanzhai Model of Car Industry

Mainland China's local automobile manufacturers Chery, Geely and Hafei had always been deemed weak in technical capacity and lacking good quality; despite this, in 2003 they impressively ranked as the top ten of China's car sales list. In the same year, own-brand cars in Mainland China's car market even achieved nearly 40% of the market share, and total exports of local-made vehicles rapidly grew from 30,000 vehicles in 2005 to 187,000 vehicles in 2007. The rapid rise of local automobile manufacturers of China has become a hot topic.

#### (1) Markets and Policies Provide Chance of Survival

With the rise in national income in China, the purchasing power of high-priced car products has also risen. Since the accession to the WTO, the commitment to drop the import tariff for the entire vehicle and auto parts year by year has created demand as a result of lower prices. And the active input of firms in Mainland China resulted in the accelerated growth in vehicle supply, again leading to a drop in car prices. The lowering of the threshold to buy a car further stimulated the consumers' desire to purchase one, influenced the market demand and formed a large and growing trend.

To control national automobile production order, Mainland China implemented the "Motor Vehicle Manufacturers and Products Announcement" system; without exception, each model of new car must first obtain "Birth Allowing Certificate" before it can be legally sold. However, under the policy thinking to promote "own technology and own brand", the Chinese government has occasionally turned a blind eye when local automobile manufacturers failed to obtain the Birth Allowing Certificate by issuing the certificate later subject to the performance.

Because of inadequate technical development capacity and the need to rapidly respond to market demand, most local car manufacturers in Mainland China copied or imitated foreign hot models either in built-in decoration or in appearance design. Hence, they were often accused of infringement by the international automobile manufacturers and taken to legal discretion. Despite the international automobile manufacturers' allegations, the ambiguous and tolerant attitude of the Chinese government often saved the day. Meanwhile, the Chinese government encourages domestic automobile manufacturers to endeavor toward self-development in their capacity of key technologies; for any automobile manufacturers achieving the standards required in the sales,

export volume and brand popularity shall be given a certain amount of R&D grants and tax concessions to sustain their investment in R&D activities. In the face of international automobile manufacturers' more advanced capital and technology, adequate funding is difficult to obtain by relying on local strength alone. Attaching importance to the automotive industry's development, the government of Mainland China assists its local automobile manufacturers, which are lacking R&D funds but have development potentiality, in accessing financial institutions for the funds with preferential amount and repayment terms for the required operational activities.

## (2) The Segmentation Strategy of Differentiation Market

Compared to the saturation and consumers' brand recognition in Tier-1 car market city, the Tier-2 and Tier-3 markets have more business opportunities and less competition, and have become the main target of local automobile manufacturers because of their large population, low rate of car ownership, growing income, coupled with international competitors' low presence.

The introduction of relevant products based on demand characteristics is a contributing factor to the quick successes of local automobile manufacturers. The younger-generation consumers with relatively low incomes and passion for the latest trends were the customer group targeted by the Chinese domestic automobile manufacturers. This consumer group has high sensitivity to price, low degree of brand recognition and low awareness of product safety due to practical constraints; great importance is attached to the appearance and configuration of the products. Therefore, provided the car prices are low enough and the quality functional, the appearance design shall not be a problem; the similarity to international brands and models soothes their vanity. Thus, despite relaxed quality standards, China's domestic automobile manufacturers still use numerous imitation methods. The ultra-low price ( $1/2 \sim 2/3$  of the price) and the popular explicit device make it the first choice for many young people buying cars.

In addition to expanding the use of the parent brand popularity, to be distinguished from the competing new brands, the Chinese local automobile manufacturers know better how to inject the consumer's psychological factors into the connotation of brand. The brand name to win the consumer group's recognition must be memorable and have personal appeal. For example, the Chery QQ is the namesake of the popular QQ instant messaging in China. The unforgettable name also stands for fashion and avant-garde sense, which aptly describes the tendency of young consumers to welcome new things.

### (3) Reduce the Development Risks and R&D Expenditures

By imitating, copying, or procuring the low-priced out-of-date design, emerging design centers significantly save the burden of designing manpower in addition to providing more design options. Meanwhile, new technologies derive problems in parameters calibration and complicated designs; therefore, the Chinese automobile manufacturers lean towards using matured and commonly used manufacturing technology to reduce the risk of product defects.

In addition, the three-stage technology adoption process will also help to adjust the strategy along with the resources and capability. Firstly, reverse engineering is used to disassemble the products, analyze architecture and components, and try to reproduce or partially modify. Secondly, foreign components are procured or royalties are paid to engage in technical cooperation with international companies. Finally, after accumulating technology and experience, self-development was directed toward producing the engine, chassis and other key components.

### (4) The Strategy of Lowest Manufacturing Cost

When newly established, to save costs, the firms purchased production equipment and designs of older second-hand car platform of foreign brands to first produce cars and then learn and explore innovative methods in the production process.

To procure non-key components, request is made for operable quality and the lowest price in principle. When the market reaches a certain degree, pressure through bulk purchases is then exerted on the parts and components suppliers for greater bargaining power.

When it is beyond their capability, the firms will seek out professional companies via module-based outsourcing arrangements, while they themselves just play the role of resource integrator. Relying on a flexible resource integration capability, without excessive amount of resource investments, they produced the products beyond their own technical capability.

Due to high testing costs, low consumer safety awareness, and try-luck mentality of local automobile manufacturers, home automobile manufacturers in Mainland China have used the controversial means of non-formal channels to obtain a pass in test reports, adopted different quality standards for testing products and assembled products, and even ignored testing operations to cut down substantial testing costs.

### (5) Trading on Strengths to Cultivate Manufacturing Capacity

When home automobile manufacturers were first established in Mainland China, they were mainly based on older models of international automobile manufacturers' platform to carry out local modification and used common parts to save design and molding costs.

Subsequently, to foster its own suppliers to master development technology and manufacturing know-how of key parts, the same components orders were distributed simultaneously to 2 or 3 international and local suppliers. More were sent to international suppliers so that personnel sent abroad could observe, record, and actively learn to transfer their knowledge to local suppliers. Depending on the local suppliers' learning progress, they reduce the proportion of orders for international suppliers.

#### (6) Step-by-Step March into the International Automobile Market

Domestic automobile manufacturers in Mainland China apply management concepts of "the countryside surrounding the city" to facilitate its rise in the domestic market and expand sales to foreign markets. As competitors have both brand reputation and quality to back them, a higher threshold to enter the market in developed countries exists. Therefore, the markets of adjacent developing countries like Russia, Southeast Asia, the Middle East, etc. are mainly targeted to meet the needs at the bottom of the pyramid such as low prices, less stringent quality requirements and high growth in the future in preparation for entry in U.S. and European markets.

In order to rapidly export own-brand products, professional exporters, under the constraints of inexperience and unfamiliarity with the laws and regulations, assisted in overseas undertakings and expanded sales markets. They then targeted at the potential market, set up overseas production base, and gradually established their own marketing system.

To obtain R&D funding and technical capacity to expand their marketing to the U.S. and European markets, some domestic automobile manufacturers with a high market share in Mainland China, by taking opportunities to establish joint ventures with international automobile manufacturers while they were seeking OEM, have produced products of higher specifications.

## 5 Conclusion

### 5.1 Research Findings

In view of Shanzhai firms' innovative model of mobile phones, notebook computers and automobiles in China, three keys are summarized including: value activity restructuring, vertical alliance and market testing.

### (1) Value Activity Restructuring

Due to failure to smoothly enter the global production network dominated by U.S. and European first-movers, the Shanzhai firms constructed a unique value network at border areas of industries through value-activity restructuring by using the industries' existing infrastructure, gathering other industrial minority firms and expanding operation scope to make up for partners' lack of capability.

### (2) Vertical Alliance

Contrary to the global production networks under the dominance of U.S. and European firms., Shanzhai firms survived by means of their core abilities and collaborated to build a common innovation platform to make up for their own lack of resources and capacity.

### (3) Market Testing

To conduct market testing of their highly diverse, high performance-price products to respond quickly to market changes, Shanzhai firms started in dynamic and ambiguous niche markets which first movers typically ignored to gradually move to the mainstream market.

## 5.2 Theoretical Contributions

In exploring the process and the influencing factors of the dynamic reorganization of Shanzhai firms' value activities, this study may compensate for the lack of business model in Teece's PFI structure on the relatively static description of complementary assets.

Moving the focus from technology to business model, this study, besides supporting the Christensen's value network and disruptive innovation viewpoint, replaces the traditional and rigid market prediction model or reliance on business leaders' wisdom by exploring the emerging dynamic markets by launching a range of high performance-price products to test the market and respond to market changes. Meanwhile, the study of the innovative business model of attackers in emerging countries adds another perspective to first movers' failure stressed by Teece and Christensen.

According to research by Bhattacharya & Michael (2008), Zeng & Williamson (2008), and Kim (1997) that focused on scientific and technological imitation, innovation strategies, and innovative types of less advanced countries' late-entrants, this study suggests that manufacturers with weak resources and capabilities utilize the existing industrial system and build an innovation platform of the unique value proposition to create competitiveness through integration.

It is found in this study that due to diverse industry features, the same innovation model may face different challenges in cross-industry applications. As most existing research work focuses discussions on the firm- or national level, this study suggests researchers ponder on the industry level related research.

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