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Transforming China in the 21st Century through Entrepreneurship

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Transforming China in the 21st Century Through Entrepreneurship

"A housekeeper can never replace a master."
-Wang Xiaoqiu, General Manager, SAIC Motor

Abstract: *China's 11th Five Year Plan, ratified in March 2006, contains a self-innovation strategy based on science and technology development that aims to transform China from being the world's low-cost manufacturer to a leading country in innovation. Promoting the development of entrepreneurship and small- and medium-sized firms are central to the plan. This paper evaluates the self-innovation strategy relative to entrepreneurship in Western economies in terms of opportunities, resources, and entrepreneur/team (i.e., the Timmons Model). Recommendations include improving government policies, procedures, and oversight; developing internal Chinese capital markets; and instituting entrepreneurship education.*

Keywords: *scientific and technical development; innovation; entrepreneurship; private equity*

China's Gross Domestic Product (GDP) exceeded $2.2 trillion in 2005, triple the level of 10 years earlier, but in GDP per capita China ranked 118 among the world's economies.[1] China is known as "the factory of the world"[2] that exports a huge volume of labor-intensive merchandise. China's 11th Five Year Plan, ratified by the National People's Congress in March 2006, aims "to transform the country from a workshop of cheap exports into a manufacturer of homegrown global brands"[3] by emphasizing *self-innovation* and internal science and technology development.

Such a transformation is an enormous undertaking. Fortunately, China's top leadership will help marshal the nation's efforts and energy toward achieving the strategic goals. But however correct, rational, and visionary the strategic conceptualization is, formulating and implementing action plans are next steps that are fraught with uncertainty with regard to both process and outcomes. Entrepreneurship is the human factor that turns scientific development into economic innovation[4] and a key part of Western economies. The purpose of this paper is to use Western approaches as benchmarks for identifying opportunities, challenges, and pitfalls inherent in China's self-innovation strategy and for recommending some potential courses of action.

The self-innovation strategy is consistent with the knowledge spillover theory of entrepreneurship "which suggests that entrepreneurship is the missing link in the process of economic growth because it facilitates the spillover of knowledge from universities and private firms, resulting in the commercialization of ideas that otherwise might remain uncommercialized" (Audretsch 2005, p.37). Science and technology development may spillover but will wash away without entrepreneurship development. In the West, small start-up firms are the heart of entrepreneurship, and the 11th Five Year Plan also focuses on developing strong Small- and Medium-Sized Enterprises (SMEs) that are entrepreneurial.

In Audretsch (2005), decision-making in the knowledge spillover theory is the realm of individuals endowed with new economic knowledge: scientists, engineers, and other knowledge workers who become entrepreneurs by commercially exploiting such new knowledge. The entrepreneur, inherently a risk-taker, is an innovator rewarded by temporary monopoly profits and is the force that creates economic growth (Schumpeter 1911). Substantial monopoly profits are eliminated by rivals entering the industry. Thus, the entrepreneur must continually search for innovations, and in the process propels long-term economic growth and the *creative destruction* of established companies and industries that are replaced by new companies and industries.

If its vision becomes reality, China will be exerting much control over its economic future. The quotation opening this paper is from Mr. Wang's press conference announcing that Shanghai Automotive Industry Corporation (SAIC) is dissolving its joint venture with General Motors and Volkswagen.[5] SAIC is forming a wholly-owned subsidiary, SAIC Motor, that will build cars for the domestic and export market using technology and know-how gained from the joint venture. SAIC's actions to control its own destiny show how important knowledge spillover can be and at least hints how GM and Volkswagen might face creative destruction in China.

China is also becoming increasing integrated with the global economy. While already linked to the economies of its major trading partners, China's a 2001 entry into the World Trade Organization obligates China to adhere to certain international standards of behavior. Foreign Direct Investment (FDI) has fueled the growth of China's economy, totaling nearly $500 billion over the last 10 years.[6] FDI in China shows no signs of abating and in fact will likely be augmented by funds invested in SMEs that result from China's self-innovation strategy. Since the bulk of such funds are likely to come from Western investors, benchmarking against Western approaches to entrepreneurship is appropriate.

China's Movement Toward Self-Innovation

China's economic growth is phenomenal. From 1995 to 2005, China's Gross Domestic Product growth averaged 9.0% annually (compared to 5.4% annually for the U.S.), while over the same period, China's merchandise exports grew from $148.8 billion to $762.0 billion (17.7% annually) and its foreign exchange reserves grew from $76.4 billion to $818.9.0 billion (26.8% annually). In 2004, China's trade surplus with the U.S., European Union, and Japan was $162.0 billion, $90.7 billion, and $20.5 billion, respectively.[7]

China is an economic powerhouse that will only grow stronger over the coming years, yet areas of concern exist. Morrison (2006) notes that abundant cheap labor provides China with a comparative advantage concentrated in low-cost, labor intensive industries comprised of manufactured products. But Morrison also indicates that:

(1) the inefficiency of State-Owned Enterprises (SOEs), about one-third of industrial production, strains the economy;
(2) the banking system is rife with insolvency and corruption;
(3) growing public unrest over pollution, government corruption, and increasing income inequality between urban and rural areas threatens social stability; and
(4) limitations in the legal system affect competition domestically and undermine the efficient allocation of goods and services in the economy.

Lam (2005) contends that the central leadership will face difficulties propagating more energy-saving, higher value-added industries. While China accounts for 4.0 percent of global GDP, it accounts for 12.0 percent of the global consumption of energy resources, 15.0 percent of water, 28.0 percent of steel, 25.0 percent of aluminum, and 50.0 percent of cement.

The Vision of China's Top Leadership

China's leadership recognizes and addresses these challenges in the 11th Five Year Plan. President Hu Jintao's keynote speech[8] at the 2006 National Science and Technology Conference highlighted a key concern: "China still has to import many key technologies and the nation's self-innovation ability is still not strong enough. The competitiveness of Chinese enterprises in core technologies needs to be improved…The proportion of the high-tech sector in the overall national economy is still relatively low. And the nation is still in need of more excellent researchers for its basic scientific research." President Hu said of the State Council's 2006-2020 science and technological development plan: "By the end of 2020, China's science and technological innovation ability will be greatly improved…By that time, China will achieve more science and technological breakthroughs of great world influence, qualifying it to join the ranks of the world's innovative countries." Accordingly, President Hu states that China should:

(1) choose a road of self-innovation with China's own characteristics;
(2) continue to put the country's self-innovation in science in a strategic position so that the country's comprehensive competitiveness will be improved;
(3) further administrative system reform so a state innovation system can be established quickly;
(4) create a favorable environment for forming a talent pool rich in the spirit of innovation; and
(5) launch a public education campaign to foster an innovative culture in Chinese society.

From Self-Innovation to Entrepreneurship: Promoting SMEs

Self-innovation is a strategic decision designed to move China beyond merely exploiting its labor cost advantage in manufacturing and merchandise trade, and SMEs are important to implementing this strategy. According to the 11th Five Year Plan (Part 3, Section 9):

"SME development should be bolstered. The construction of innovation training bases and entrepreneurial service centers should be stepped up so as to offer SOEs better technical guidance and counseling services… Emphasis should be put on supporting SMEs' projects relating to financing guarantees, entrepreneurial guidance, independent innovation, clean production, international cooperation and personnel training while fostering commercialized SME service systems… SME entrepreneurial guidance fund should be earmarked to encourage investment in businesses. The construction of SME financing service platform should be facilitated to help capable SMEs tap into the capital market for funds and construct an open financing system for them."

The Timmons Model of the Entrepreneurial Process

The *Timmons Model of the Entrepreneurial Process* is a well-known normative model and will be used as a framework for evaluating China's self-innovation strategy relative to Western benchmarks. The Timmons Model involves three factors: Opportunity, Resources, and Entrepreneur/Team.[9]

Opportunity. The entrepreneurial process is opportunity driven. An opportunity is an innovation that creates enduring economic value. Market demand, market size and structure, and profit margin potential help define and distinguish opportunities from ideas. China's plan for science and technology development will be the source of opportunities for the self-innovation strategy.

Resources. Resources broadly refer to the financing needed for the commercialization of an opportunity. Typically, a business plan forecasts the financing required as well as other resources needed, such as staffing and headcount, to exploit the opportunity. Investors external to the firm provide the bulk of financing for entrepreneurial firms.

Entrepreneur/Team. The entrepreneurial team is a key ingredient in a new venture. To Timmons, the *lead entrepreneur* is central to the team as both a player and a coach, establishes a culture based on the ability to rapidly learn and effectively deal with adversity, and exhibits commitment, integrity, dependability, honesty, a track record of success, and tolerance for ambiguity.

Timmons considers the entrepreneurial process as *resource parsimonious and creative,* depending on the *fit and balance* among these factors, and *integrated and holistic.* The entrepreneur must assemble the right team and raise the correct amount and type of financial resources to exploit the opportunity. The Timmons Model can be used to identify gaps in the process that need to be filled, and success occurs only when the factors fit together. Such a holistic state may be temporary if the firm continues to grow and progress through different stages of development, requiring fit and balance among the factors to be found again.

Opportunities

Audretsch (1995, p. 180) holds that "It is the knowledge in the possession of economic agents that is exogenous, and in an effort to appropriate the returns from that knowledge, the spillover of knowledge from its producing entity involves endogenously creating a new firm." Audretsch, et al. (2006) find that investment in new knowledge is associated with start-up activity, especially in knowledge-based and high-tech industries. Audretsch and Feldman (1996) show that knowledge spillovers are bounded by geographic proximity to where knowledge is created, but Audretsch et al. (2006) find a non-homogeneous relationship that varies across disciplines.

China's plan to build science parks is consistent with the knowledge spillover theory. The 44 science parks established in China between 1999 and 2003, including those at the Beijing Institute of Technology, Shanghai University, and Jilin University, attracted $3 billion of investment. By 2006, the 50 existing parks have set up 5,000 businesses. Wu (2006b) reports that China plans to build 30 additional science and technology parks by 2010 for a total of 80 parks and that the "parks act as 'incubators' for small- and medium-sized high-tech companies, many of which are set up by universities or students." Xu Luping of the Ministry of Science and Technology says that science parks are important to creating innovation "because university-

based researchers are among the most productive in China."[10] Wu (2006a) reports that by 2020 the State Council will increase R&D spending to $112 billion, to 2.5% of GDP from 1.3% currently, reinforcing the notion that China will use science as a tool for development.[11]

Indeed, there are indications that China is having success at developing science and technology. The World Intellectual Property Organization estimates that China's 2,452 international patent applications in 2005 rank 10th among all nations. While representing about 5.0% of the U.S.'s 45,000 applications, China's total has tripled since 2000.[12]

Challenges

One major issue will be for China to measure the effect of top-level plans and policies. For example, in 2003, U.S. Federal labs disclosed roughly 4,400 inventions, 2,200 patent applications, and 1,600 patents issued, with 6,400 licensing agreements generating $96.4 million in royalties.[13] However, sufficiently judging success of government-supported R&D is illusive:

> "The outstanding performance metrics challenges remain, as they have for some time, in the areas of measuring downstream impacts from the federal labs' technology transfer activities and in identifying and using measures that can help technology transfer managers better understand the effectiveness and productivity of the programs they operate. In general, it remains far easier to assemble statistics on technology transfer activities (e.g., CRADAs [Collaborative R&D Agreements] established, patents received, licenses executed) than it is to measure downstream benefits and the effectiveness of implemented federal lab programs for technology transfer."[14]

The U.S. President's Council of Advisors on Science and Technology (2003) makes several recommendations that China's top officials should also note, including: formalizing oversight and accountability, recognizing industry differences, documenting best practices, centralizing technology transfer information in one location, and improving metrics and documentation. The 11th Five Year Plan is a beginning, and actively managing its implementation will be crucial.

Another challenge will be for China's government to exert enough control over the process and outcomes. China's spending on scientific R&D was $24.6 billion in 2004 (up 28.0% from

2003), but the drive to make China a scientific superpower seems to have created a Wild West climate where top researchers, under intense pressure to produce, are tempted to fake results or copy the work of others.[15] Ambitious plans can lead to desperate actions, but oversight as outlined in the preceding paragraph can limit such egregious behavior.

Tassey (2006) highlights the problems of inadequate technology infrastructure. U.S. investment in physical infrastructure such as roads, bridges, canals, and railroads unified regional markets and increased economic efficiency in the Industrial Revolution, but complex technology infrastructures today are segmented, ubiquitous (i.e., cut across many technologies), and largely invisible. The result is underinvestment in "infratechnologies", inadequate standards setting processes, inappropriate standards (e.g., proprietary vs. open source), and ineffective standards deployment relative to market needs. Tassey (2005) identifies three policy concerns: technological opportunity (represented by industry "generic" technology), adequacy of technology infrastructure, and the shifting nature of policy response mechanisms. He places "public good" research from governments and universities at the center of new technology development, yet the interplay of generic technology, supporting infrastructure, and proprietary market applications (innovation) creates economic growth from R&D.

If the focus is only on scientific development (e.g., patents applied for or issued) without promoting technical standards and infrastructure that have public-good aspects extending beyond any one researcher or company, the resulting "Wild West" environment will squander resources without producing the expected economic growth. Singling out SMEs as the vehicles to drive China toward self-innovation can exacerbate the problem of control, performance measurement, and standards setting since such firms are typically thin in management and resources, and often fly under the radar of required reporting mechanisms.

Resources

Debt and equity are fundamental business financing vehicles. For most new ventures, debt not appropriate in the early stages due to the lack of sufficient earnings and/or assets to serve as collateral, so equity is the typical vehicle for financing entrepreneurs and their start-up companies.[16] Private equity common stock is not registered with security regulators for trading on a stock exchange while public equity common stock is registered. Entrepreneurship is often promoted by venture capital investors (VCs) who hope to turn a start-up company's shares into publicly-traded shares through an Initial Public Offering (IPO). The U.S. economy has benefited: venture capital-backed companies in 2003 employed more than 10.0 million workers, generated $1.8 trillion in revenues, outperformed non-venture-backed firms, sustained employment growth in most industries, and were concentrated in heavy R&D industries (Global Insight 2004).

Ernst & Young (2006) report that the U.S., Canada, Europe, and Israel account for 93.0 percent of the $31.3 billion of venture capital invested globally in 2005; the National Venture Capital Association notes that U.S. VCs invested $22.3 billion in 3,027 deals in 2005.[17]

Black and Gilson (1999, 1998) link stock markets and venture capital markets: if VCs cannot "exit" investments in the near- to moderate-term, they are less likely to invest in start-ups. Black and Gilson show that stock market-centered countries have more entrepreneurial activity than commercial bank-centered countries. In 2004, 70.0 percent of private equity in bank-centered Europe went to buying out existing firms and only 7.0 percent was seed/startup investment.[18]

Challenges

China's $1.1 billion of venture capital investment in 2005 is 3.5% of the global total (Ernst & Young 2006), and such investment must grow dramatically to fulfill the self-innovation strategy. Domestic Chinese and foreign VC firms raised $4.0 billion in 2005—a record amount

suggesting a bullish future for VC investments in China (Ni 2005). However, China's stock markets are small. According to the World Federation of Exchanges,[19] in 2005 the Shanghai and Shenzhen exchanges rank 21st and 32nd in market capitalization, only 2.15% and .87%, respectively, of the top-ranked NYSE's $13.3 trillion market cap. The NYSE and Nasdaq listed 5,434 firms in 2005 which the Shanghai and Shenzhen exchanges listed 1,377 firms.

Speaking at the 8th China Venture Capital Forum (CVCF) in Shenzhen in April 2006, Xu Guanhua, Minister of Science and Technology, stated that an exit mechanism is needed for SMEs to play a positive role in the self-innovation strategy and emphasized that developing China's capital markets is key for venture capital. Ernst & Young (2006) rank the lack of a Nasdaq-like exchange for IPO exits first among important challenges facing China's VC industry. The outlook presented at the CVCF was positive: in 2005, interim regulations were jointly advanced by 10 ministries regarding financing and taxation preferences for venture capital, movement was made toward full tradability of SME shares to facilitate IPOs and mergers and acquisitions, and revised Securities Laws lowered the threshold for IPOs.

Minister Xu also noted that long R&D cycles and high risk make bank loans not suitable for technological start-ups so that venture capital is essential. He listed many other challenges: weak corporate self-governance and incentives; a too-small VC market (e.g., it can't finance biotech start-ups); and relative to domestic VCs, foreign VCs are stronger, more proactive, and prefer IPOs on foreign exchanges. Ernst & Young (2006) identified more challenges: weak intellectual property protection makes capitalizing on innovation difficult, a shortage of company and investor management talent, underdeveloped technology transfer system, central government control in the venture ecosystem results in disincentives for entrepreneurs and investors, and a lack of stability in regulations; these reinforce concerns that Tassey (2005, 2006) expresses.

The CVCF gave hope that some of Morrison's (2006) concerns will be addressed: self-innovation can create a "harmonious society" that will narrow the urban-rural income gap and lead to less pollution-producing industries, and that the legal and regulatory system will be modified to promote economic growth from science- and technology-based development. Representatives from Nasdaq and London's Alternative Investment Market (AIM[20]) extolled the benefits of IPO exits on these markets, but the indications are that China would like to develop internal capital markets to better control its own future. However, a form of the VC "golden rule" will have influence ("whoever has the gold, rules"), and pressure from global investors will continue to push for improved securities regulations, stronger intellectual property protection, and more transparent corporate internal governance. For example, regulations introduced in early 2005 restricted VCs from establishing off-shore corporate structures to exit a Chinese company via a foreign IPO. After VCs significantly reduced investments in China, regulators reversed the restriction.[21] Still, much work remains and much flux exists in these areas.

Entrepreneur/Team

The knowledge spillover theory specifies entrepreneurship as an endogenous response to investments in knowledge not exploited by existing firms and considers entrepreneurs agents for change by creating a new firms (Audretsch 2005). In Audretsch, et al. (2006), entrepreneurship links knowledge creation and economic growth while Audretsch and Thurik (2002) show greater entrepreneurial activity leads to greater economic growth in a sample of OECD countries.

Kjellman and Ehrsten (2005) focus on how entrepreneurship can be fostered and posit that entrepreneurial behavior is a function of the individual, environment, and culture. The individual's psychological life space (from Kurt Lewin, the "father of social psychology") involves experience, real time, and aspirations being driven in part by thoughts, attitudes, self-

perception, and choices. The environment involves expectations, possibilities, risks, education, upbringing, needs, social models, family, and friends while culture involves norms, rules, history, and societal attitudes. Kjellman and Ehrsten admit that human behavior is too complex and individualized to be fully captured by their specification. They propose an educational model that directly exposes students to entrepreneurship throughout their education.

If the knowledge spillover theory makes entrepreneurship endogenous, then Kjellman and Ehrsten do the same for entrepreneurs: entrepreneurs can be made, not just born. Audretsch (2005) also calls for entrepreneurship education as well as technology transfer from universities to the private sector to stimulate economic growth by fostering entrepreneurship.

A step in this direction was taken by the April 2006 Nankai University-Babson College International Conference for Entrepreneurship Research and Education. Babson professors Jeffry Timmons and Stephen Spinelli, who attended the conference, offered an additional two-day workshop to train Chinese educators on how to teach U.S.-style entrepreneurship education.

All of this bodes well for the 11th Five Year Plan's self-innovation strategy. Emphasizing science- and technology-based knowledge creation will generate spillover to economic growth through entrepreneurship fostered by entrepreneurship education. If environment and culture are part of the equation, China can choose a path that expresses China's own characteristics, create a talent pool rich with innovative spirit, and launch a public education campaign to advance an innovative culture in Chinese society—achieving both President Hu's exhortation and the need to bolster SME development described above.

Challenges

If entrepreneurs are born, not made, and/or if Western-style entrepreneurship is the "correct" model, then the self-innovation strategy will not be achieved to the extent or in the fashion

envisioned. MacMillan, et al. (1985) survey VCs about criteria important for new venture success and find that the entrepreneur's personality and experience is crucial. Key variables are: capable of sustained intense effort, evaluate and react well to risk, articulate in discussing the venture, familiar with target market, demonstrated past leadership, and relevant track record. Elango, et al. (1995) substantiate the importance of these variables.[22] While some characteristics can perhaps be developed through education, others may elude formal training.

Indeed, Chinese with technical and/or managerial experience in U.S. start-ups can command a premium; as related in a lunch-time conversation, a Silicon Valley Bank Senior Vice President – Asia for Global Financial Services, such individuals can command salaries of U.S.$135,000 to $150,000. Such anecdotal evidence perhaps circles back to the Kjellman and Ehrsten argument—entrepreneurship perhaps can be learned but at least in the short term may reflect Western culture more than China's.

Liao and Sohman (2001) conclude that Chinese entrepreneurs display worldwide entrepreneurial characteristics of perseverance, diligence, integrity, resourcefulness, emotional stability, intelligence, and harmony. The prominence of luck and fate in Chinese culture might explain reliance on opportunism over long-term strategy, and they note that the speed with which individuals move from one business to another means an entrepreneur's suppliers might not be there in a year or two and that returning Chinese entrepreneurs often maintain a safety net of dual citizenship or green cards and leaving family overseas while pursuing start-ups in China. Environmental limitations are political and legal uncertainty from volatile government policy; lack of access to funding, skilled labor, managerial talent, infrastructure, and technology; the low social status of private business is changing rapidly. Liao and Sohmen are optimistic that Chinese entrepreneurs' resilience and resourcefulness ultimately will point to success.

A permeating effect in Chinese culture with roots in Confucianism is *quanxi*, defined by Chen and Chen (2004, p. 306) as "informal, particularistic personal connection between two individuals who are bounded by an implicit psychological contract to follow the social norm of *quanxi* such as maintaining a long-term personal relationship, mutual commitment, loyalty, and obligation." They note that trust and feeling affect *quanxi* quality, and a simple web search reveals numerous references to the inability of Westerners to conduct business in China without first building *quanxi*. Many of the papers at the Nankai-Babson Entrepreneurship conference studied *quanxi* in the context of social networks.[23] Liao and Sohen (2001) note that corruption, bribery, and other "under the table" activities are implicit in *quanxi* and that the "right" kind of connections are important. While business contacts are important, Western business relies more on merit, performance, and "arms-length" negotiation. Issues of *quanxi* must be considered by VCs investing in China as well as in Chinese entrepreneurship education.

Aspects of the individual, environment, and culture still remain as challenges. Emphasis on scientific education might lead to efforts at building a "better mousetrap" rather than a solid business, but college graduates who study business aspects of entrepreneurship will be limited by having education without experience. Kjellman and Ehrsten's (2005) environmental factors have permeated this paper as challenges of government policy, regulations, and infrastructure. Liao and Sohmen's (2001) optimism about successful Chinese entrepreneurship due to individual characteristics point to an evolving Chinese entrepreneurship culture that might conflict with the goal of China's top leadership to obtain self-innovation with China's own characteristics.

Recommendations

This section consolidates the discussion above by offering recommendations to substantiate the success of the self-innovation strategy with reference to attributes of Western economies.

Continue reforms of administrative, legal, and regulatory systems. Because these systems are fundamental in defining the business environment and cut across opportunity, resource, and entrepreneur/team dimensions, this recommendation is paramount. The onus is on the Central Government to move beyond conceptualizing the self-innovation strategy to coordinating policy formulation and implementation. Major concerns will be: how science and technology development occurs to assure successful knowledge spillover; technology infrastructure development and oversight; internal capital market formulation and regulation; and improved intellectual property protection, corporate governance, and entrepreneurship education. Pressure from foreign investors will push for more Western-style capital market operation and open, transparent corporate governance. Developing technical standards cutting across all Chinese industries is important but should not cut off the rest of the world from China's markets.

Aligica and State (2005) discuss European Union (EU) entrepreneurship policies for SMEs, innovation, and competitiveness and conclude that no central vision or strategy exists. While they find EU policies overly broad and vague, the general objectives are quite similar to those described in the 11th Five Year Plan. Since the EU entrepreneurship policy extends back to 1983 roots yet ends up relying on the U.S. model as an ad hoc standard, China must have long-term dedication to the self-innovation strategy while learning from U.S. and EU efforts.

Proceed carefully with science and technology development. The danger is considering the development of science parks as jump-starting self-innovation. While necessary and consistent with knowledge spillover theory, results will depend as much on implementation as conceptualization. Simply devoting more resources may not achieve the desired result if the U.S. internet bubble is any indication. Culminating with VC investments of $104.0 billion in 2000—five times the annual amount since then—the bursting bubble drove the Nasdaq index to 25.0%

of its peak value in 2001. U.S. venture-backed IPOs fell from 226 in 2000 to 41, 24, and 29 in 2001 to 2003. "Irrational exuberance" seemed to dominate VC behavior during the bubble, and China would be well served to avoid such exuberance in funding scientific development.

Determine what promoting SME development means. The discussion above about the 11th Five Year Plan's call for developing SMEs is broad and vague. In this paper, SMEs seem to be only what Timmons and Spinelli (2003) term high potential firms—such firms are IPO-worthy, stimulate large markets, often offer disruptive technologies, and provide large opportunities for employment growth. Even Timmons and Spinelli acknowledge that most firms are not high potential, and many are no more than lifestyle firms (i.e., providing good lifestyles for owners). Aligicia and State (2005) note that the EU defines micro-, small-, and medium-sized firms by number of employees, annual revenue, or balance sheet totals but also defines entrepreneurship in terms of mindset and attitudes. They note that this lack of operational and conceptual consistency leads to a lack of a coherent overall policy. While the payoffs are great for high potential SMEs and focusing on these SMEs might earn China the status of an innovative nation, developing all categories of SMEs will be necessary to solve urban-rural and poverty problems. The 11th Five Year Plan's self-innovation strategy is a good, but not complete, first step.

Develop entrepreneurship education programs. The Nankai-Babson entrepreneurship conference and training workshop is an example of what is needed at this stage. Creating knowledge is only half of the equation—creating successful businesses is the other half. Following Kjellman and Ehrsten (2005), China should promote entrepreneurship education across universities and disciplines. Expanding partnerships with Western Universities that have entrepreneurship programs should be encouraged. Extending the concept of entrepreneurship to more than high-potential SMEs should be made explicit in China's entrepreneurship education.

Choose a path for self-innovation in which "China's own characteristics" are not exclusionary. If U.S. and EU approaches have merit and Western investors, customers, and business partners important, then China will need to embrace more, not fewer, global connections. If "China's own characteristics" means insularity and exclusion of outsiders from China's markets, then the self-innovation strategy will not have the success envisioned. Technology, competition, and capital transact in global markets, and China should not retreat from this. China's culture will thus be susceptible to change—but relying more on long-term strategy than opportunism could be a good change, for example. A careful balancing act could ensue—retaining Chinese culture and control while moving toward Western business and legal standards will not be easy.

The Road Ahead: Final Thoughts

Assuming that the self-innovation strategy attains successful first steps, other challenges will emerge, two of which will be discussed briefly. If knowledge is created that spills over to start-ups, then the focus will shift to successful commercialization, and Chinese SMEs will face the problem of crossing the chasm between early adopters and early majority customers (Moore 2002). Moore's insight is that the different segments are distinct markets and he holds that marketing holds the key to successful crossings. If the self-innovation strategy creates an innovative mindset, successful technical innovation will subsequently require a business mindset.

A shortage of private equity capital is likely to occur. The whole emphasis currently seems to be on venture capital and subsequent stock market IPOs. If the concept of SME extends beyond only high-potential ones, then alternatives to venture capital will be needed.

The self-innovation strategy has a laudable vision with valuable long-term outcomes but is best considered a continuous process with improvements and adjustments made along the way. If so, then China should hope for a series sure steps rather than attempting a great leap forward.

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Notes

[1] China's GPD figure is taken from the China Internet Information Center web page (http://www.china.org.cn/english/features/guideline/156529.htm) and converted to U.S. $ at the rate of Yuan 8.0184/$, as reported by Bloomberg.com on April 14, 2006. China's GDP per capita ranking is taken from Central Intelligence Agency (2006), The World Fact Book 2006. For comparison purposes, U.S. GDP in 2005 was $12.5 trillion according to the Bureau of Economic Analysis (2006).
[2] Asia Market Research News (http://www.asiamarketresearch.com/news/000228.htm) attributes this designation to Robert Mundell, Professor of Economics at Columbia University New York and Nobel Laureate.
[3] "NPC Endorses Five-Year Economic and Social Plans," China Internet Information Center web page (see note 1).
[4] Simple, practical definitions are offered by investorwords.com: entrepreneurship is "the assumption of risk and responsibility in designing and implementing a business strategy or starting a business," and innovation is "the creation of new products and/or services."
[5] Bradsher (2006). The quotation is an old Chinese proverb.
[6] China's FDI is taken from the China Internet Information Center web page (see note 1).
[7] Figures for China are taken from Morrison (2006). The 2005 foreign exchange reserve figure is taken from the China Internet Information Center web page (see note 1).
[8] The discussion of President Hu's speech is taken from "China Honors Top Scientists," China Central Television.Com, January 9, 2006.
[9] The discussion of the Timmons Model is from Chapter 2 of Timmons and Spinelli (2003).
[10] Quoted in Wu (2006b).
[11] Wu (2006a) also notes that China plans to use "scientific prowess" to remove poverty by 2050 and that the State Council intends for 60.0% of China's economic growth to come from science and technology by 2020 and for reliance on foreign technology to decrease from over 50.0% to less than 30.0%.
[12] The World Intellectual Property Organization's statistics can be found on its web page: http://www.wipo.int/index.html.en. For the U.S. in 2005, there were 381,787 domestic patent applications and 151,079 domestic patents issued according to the Intellectual Property Owners Association (http://www.ipo.org/).
[13]Office of the Secretary (2004). The report states that "Federal labs" refers to government-owned or -leased federally staffed facilities for performing research, development, or engineering activities relevant to an agency's missions and interests. The government-owned but contractor-operated facilities with a similar purpose also fall under the "Federal lab" title. The U.S. Federal lab system presently encompasses more than 700 Federal labs and research centers.
[14] *Ibid*.
[15] Einhorn (2006). He lists several specific cases and mentions biochemist Shi-Min Fang, whose web site has purported to have exposed 500 cases of illegal or unethical behavior since 2000.
[16] Debt, whether bank loans or bonds, requires interest and principle payments under the threat of forcing a non-paying borrower into bankruptcy while equity represents a residual position (i.e., whatever is left after debt and other claims are paid) that accepts the risk of loss without recourse to bankruptcy.
[17] See the NCVA web page: https://www.nvca.org/ffax.html.
[18] PricewaterhouseCoopers (2005).
[19] See the World Federation of Exchanges web page: http://www.world-exchanges.org/WFE/home.Asp.
[20] AIM benefits include: no minimum shares to be in public hands, no trading record requirement, no prior shareholder approval, and no minimum market capitalization. Another point emphasized at the CVCF: AIM has no Sarbanes Oxley compliance that seemingly puts Nasdaq at a competitive disadvantage. Since opening in 1995, AIM has listed more than 2,200 companies that have raised more the $4.0 billion.
[21] Ernst & Young (2006, p. 67). The report continues (pp. 67-68) with positives and negatives about China's capital markets. Negative considerations are inconvertibility of the Chinese yuan, inflexible corporate law, and prohibitions on sophisticated VC investment structures. A positive is optimism—that reforms will continue, companies are stronger and growing, and domestic pension funds and insurance companies will accept venture investing.
[22] After hearing in-class presentation by VCs, students are always impressed by how the results of these "old" studies are applicable in the current Silicon Valley environment.
[23]Unfortunately, this paper's author cannot read Chinese, so there are no citations.