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## An Explanation for Singapore's Innovation Gap

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*Why can't Singapore innovate? Innovations tend to come in two varieties: radical or incremental. Radical innovations, like the internet or biotechnology, involve the development of entirely new products. Incremental innovations occur with continuous small-scale improvements, as with automobiles over the last 100 years. Each type of innovative style requires a different set of complementary institutions. The problem for Singapore is that it combines institutions; as a result, they generate conflicting innovation incentives which ultimately undermine the building of a durable base of innovative activity.*

Despite being wealthier than France, Germany, and Japan on a per capita basis, and despite numerous government efforts to spur innovation, Singapore has had considerable difficulty in building a durable base of entrepreneurial activity. Many ascribe this failure to a culture of risk-aversion and a lack of creativity. In contrast to this conventional view, we argue that Singapore's institutional arrangements generate conflicting innovation incentives, which ultimately undermine innovative activity.

Innovation basically occurs in one of two ways – either via *incremental*, or small-scale, improvements to existing products, or via *radical* innovations which involve substantial shifts in product lines, or the development of entirely new goods. An example of incremental innovation is the continuous improvements to automobiles since they were first invented in the late nineteenth century. Germany and Japan excel at this. New, groundbreaking ideas in high-technology such as the internet or biotechnology are examples of radical innovations, which the US excels at. Why? The structure of a country's economic institutions generates incentives that foster different types of innovation. First we explain how institutional arrangements encourage different types of innovation, and then we look at Singapore.

### **Incremental Innovation: Focusing on the Long Term**

Incremental innovations occur most often when companies focus on the long-term. The key institutional arrangements include employee job stability, stable inter-firm relationships, and concentrated corporate ownership.

Incremental innovation requires cumulative learning where long-tenured workers acquire firm-specific skills. Firms invest in employees' specialized training when they are sure that poaching by others is not possible, and when skilled workers are likely to stay and contribute.

Likewise, for firms to invest in specific physical assets, they have to be confident in their long-term arrangements with major suppliers and clients. An environment that promotes long-lasting and intimate inter-firm relationships is crucial for incremental improvements. Such arrangements foster the cultivation of trust, certainty and camaraderie throughout the value chain in the case of Japan, or closer sectoral partnership in Germany, both of which are necessary to enforce sanctions for defection of an employee from a firm, or for defection of a firm from a collective agreement. This further enables the costs, benefits (via knowledge spillovers), and risks of R&D to be spread among the parties. The aim is for everyone to grow in the process, uninterrupted by occasional difficulties for individual firms.

And when there is a dominant owner of the firm, she can shield the firm from short-run capital market pressures, greatly reducing the threat of being taken over. This enables managers to focus more on long-term productivity growth instead of worrying about consistently meeting quarterly earnings objectives. And by being held accountable to a dominant owner for their misjudgments, the managers will opt for lower-risk strategies and continuous improvements on established products, focusing on incremental innovations to build a competitive edge.

### **Radical Innovation: High Risk Gains**

Radical innovations occur when institutions cultivate a focus on the short-term. A fluid labour environment and market-based relationships are important to firms in fast-moving technology sectors facing uncertain market demand, accompanied by an equities market where corporate ownership is dispersed.

The ongoing hit and miss of new product lines is an essential part of these businesses; firms hope that one blockbuster product can yield rewards that far recover the total costs of unprofitable endeavors. A flexible labor market enables a firm to hire employees with required skills, with the knowledge that they can be dismissed if the project does not materialize.

Arms-length relationships also enable firms to quickly acquire a new capability through poaching of employees, licensing of a new product, or simply buying out a firm with the technology. In these fast-evolving sectors with many uncertainties, speed and flexibility are the keys to survival; commitment to a strong inter-firm relationship can be a liability.

The nimbleness of firms requires a concentration of decision making power at the top level of management. They must be able to formulate and implement a new plan, to switch production lines, or to reallocate resources rapidly throughout the enterprise without having the need to seek workers' or owners' approval to justify any drastic actions. Managers tend to wield greater power when owners are dispersed – as in the US. And compared to bank and state financing, a liquid and vibrant equity market is better at coping with novelty and catering to investors with heterogeneous risk appetites. It allows a company to raise capital for a radical proposal where market players hold widely divergent expectations on its profitability.

A deep and vibrant stock market enables the development of a thriving venture capital market, which is important to the success of technology districts such as Silicon Valley. A vibrant stock market permits venture capitalists to exit through an initial public offering. At the same time, studies of Silicon Valley point to the role of employee mobility between employers and to start-ups in contributing to the incessant waves of radical innovation in such high technology districts. The constant flux of knowledge spillovers enables a high-tech cluster to continually renew itself through formation of new firms and new R&D competencies.

### **Choice for Singapore**

Singapore combines elements of each approach, which creates conflicting innovation incentives, and ultimately undermines innovative activity. Here, employees are mobile, with job tenure generally

short-lived. Poaching of employees by other firms is very common, and firms deal with each other at arm's length. These arrangements tend to be more compatible with producing radical innovations, as in the US. However, corporate ownership tends to be highly concentrated, which encourages management to focus on low-risk strategies, and to pursue incremental innovation, as in Germany and Japan.

Singaporean managers and employees may be exceptionally creative, but because the institutions foster conflicting innovation styles, their efforts do not produce sustainable innovative activity of either type. To resolve this dilemma, Singapore has a choice: (1) create longer-term employment and closer inter-firm relationships; or (2) disperse corporate ownership and cultivate a thriving venture capital market. In light of its unique cultural and economic circumstances, which type should it choose?

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