The Role of Japanese Start-ups in High-Tech Innovation

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Policy Brief

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This policy brief describes the current state of start-ups in the Japanese electronics industry and suggests ways Japan can support innovative start-ups that complement the innovation already provided by its large electronics companies. Relative to other countries, particularly the United States, Japan depends more on its large companies and less on start-ups for innovation. In the electronics sector, the last Japanese start-up to grow to more than $1 billion in sales was Sony, which began as a self-funded company in 1946. By contrast, many of the major electronics companies in the United States are much younger, including Intel (1968, venture-funded) and Cisco (1984, venture-funded from 1987). The important role of smaller companies in the innovation process in the U.S. is highlighted by the fact that NSF data show companies with less than 250 employees account for 9% of manufacturing R&D spending, and have an R&D-to-sales ratio of 7.5%. In Japan, MIC data show that firms with up to 300 employees account for 4% of manufacturing R&D spending with an R&D-to-sales ratio of only 2.2%.

The potential for exploiting high-growth opportunities is just one reason that start-up firms are an important part of a country’s innovation system. Small companies are able to develop projects that have been discarded by large companies, even though they have commercial potential. The major Japanese electronics producers undertake a great deal of R&D, and only a small portion of the ideas generated are internally developed. We learned in our interviews in Japan and the U.S. that about 70% of the ideas will never be developed because:

- the company lacks the resources to pursue all the available ideas;
- some ideas are not related to the company’s core capabilities;
- some ideas compete with the company’s existing products; or
- the potential market appears too small, and so the company’s high overhead costs make the project unprofitable.

Discussion that focuses only on the relative merits of large companies versus start-ups for innovation misses the important point that both types of companies are critical in a country’s innovation process.

Similarly, comparisons of Japanese and Western models for start-ups miss the point that Japan needs a start-up system suited to its existing institutions. The Venture Capital Model made famous in Silicon Valley targets opportunities for high, rapid growth. Since only 10% of venture-funded firms succeed, this model is not congruent with Japanese economic institutions and culture where failure carries a heavy penalty such as the inability to obtain bank financing for a new venture for ten years after a failure. To fit its national institutions, the Japanese start-up model must be more accumulative with lower revenue goals and lower risk compared to the US model.

The Japanese government has already made important changes in the laws regulating start-ups, but that only removed some of the obstacles for new companies. Japanese start-ups still face four major difficulties:

1. securing early-stage financing, since Japan’s venture capital funds mostly later-stage companies;
2. acquiring management and marketing skills, since there are a limited number of executives with start-up experience;
3. finding customers, since large Japanese companies prefer established suppliers;
4. recruiting engineers, who don’t want to lose the status and security provided by a large company.

**Paths for Emergent Technologies**

In our fieldwork in Japan, we observed several methods for developing new technology by large companies (corporate subsidiary, shanai venture, and independent spin-out) and by emerging companies (cooperative venture and independent start-up). These methods are shown in Table 1 by the distinguishing features of their critical inputs (technology, executives, and early-stage resources) and are listed in order of the degree of corporate control (or increasing independence) from left to right. In addition the table includes the U.S. Silicon Valley model.

<table>
<thead>
<tr>
<th>PATENT RIGHTS</th>
<th>corporate division or subsidiary</th>
<th>shanai venture</th>
<th>independent spin-out</th>
<th>cooperative venture</th>
<th>independent start-up</th>
<th>Silicon Valley</th>
</tr>
</thead>
<tbody>
<tr>
<td>controlled by big company</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>controlled by small company</td>
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<tr>
<td>EXECUTIVE TEAM</td>
<td></td>
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<td></td>
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<td>can return to the big company</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Independent from big company</td>
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<tr>
<td>EARLY STAGE RESOURCES</td>
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<td></td>
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<tr>
<td>majority finance from big company</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in-kind support* from big company</td>
<td>X</td>
<td>X</td>
<td>0</td>
<td>X</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>founders’ funding and sales</td>
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<tr>
<td>early-stage venture funding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
A common method of creating new companies in Japan is for a large company to assign a developed technology to a wholly-owned corporate division or subsidiary that remains under corporate control. We consider these divisions or wholly-owned spin-offs to be paths to commercialization rather than innovation because they typically involve a late stage of product development, and employees are still under the large company’s umbrella and protected from failure as well as prevented from sharing in high returns from the innovation. An example of this is Hitachi’s Mu Solutions division that was created to commercialize wireless data tags.

A related case is the shanai venture that is not wholly-owned but which remains under the parent company’s influence. There are many possible variations, but a shanai venture company receives technology, employees, and financial support such as loans, purchases of product, and access to company labs, from the parent company. Shanai venture companies are often difficult to identify because the links to the parent company may not be visible to outsiders. A semiconductor start-up, Sixon (connected to Sumitomo Electric), appears to fit this pattern.

We do not consider the shanai venture company to be a true start-up to the extent that employees, risks and returns are still tied to the parent company. Characteristics of these companies can include not having exclusive rights to its core technology, having more than 50% of the start-up’s resources controlled by the large company, having key employees on leave from the big company and able to return to it, and having the parent company as the sole or primary customer.

The independent spin-out model, used more in the US than Japan, represents a more autonomous type of corporate spin-out. When a parent company has a technology that it chooses not to develop, the engineers who worked on the technology leave to start a new company that receives an exclusive technology license and only partial funding from the parent company. An example is Fab Solutions, which markets an advanced system for process control in semiconductor manufacturing. Four engineers from NEC were allowed to take the business private in 2002. They have obtained two rounds of venture funding and were included in a list of “Top Emerging Start-ups” in a semiconductor industry newspaper.¹

The cooperative venture involves an independent start-up that enters a strategic alliance with a larger company that provides up-front resources in return for a share of the licensing fees or a share of output. The large company will usually be part of the venture company’s supply chain (e.g., an equipment supplier or potential customer). This relationship overcomes some of the problems facing venture companies in Japan. This model has the advantage of providing better resources and, in the case of downstream cooperation, better access to customers. In the components sector, THine Electronics was founded in 1991 as a joint venture with its customer Samsung Electronics, and the founders were able to buy out Samsung’s share in 1997. A younger

A more difficult path to success is the self-funded independent start-up model used by many young Japanese companies in the electronics industry. Initial funding is provided by the founders, who sell services to generate cash flow while a new product is being developed. For example, start-up semiconductor firms in Japan often sell chip design services while developing their own chip. This was the model followed by MegaChips, a “fabless” semiconductor company founded in 1990 and listed on the Tokyo Stock Exchange in 2000.

Although this model can succeed, it is a slow path to innovation. Independent start-ups suffer from inadequate initial funding and from lack of access to large Japanese companies as customers. Most founders cannot finance a start-up until they are at least 45 years old and have access to their retirement fund. The services business, which has limited growth potential, requires as much as 80% of the managers’ and engineers’ time, which slows down the development of an innovative product.

An important variant is the Silicon Valley model where the start-up adopts a high-risk, high-return strategy of commercializing innovative technology with funding from venture capitalists. This model, pursued by visionary firms like Internet companies Rakuten and Google, is slowly becoming more common in Japan. However most venture-funded start-ups in Japan are less ambitious than those in the United States, and Japanese venture capital mostly goes to later-stage firms. Companies like Sony and Matsushita operate corporate venture capital subsidiaries, but so far most of their investments are outside Japan.

Given the many constraints on entrepreneurs in Japan, we advocate an evolutionary transition toward the right-hand side of the table along the following lines:

- Corporations with technologies they are reluctant to develop in-house should consider independent models, moving from a shanai venture model to an independent spin-out, where the new company receives a clear license to the technology and “seed funding” from the large company.
- Young companies pursuing an independent start-up model should consider a more ambitious business plan to be funded by venture capital, possibly including funds from non-Japanese investors.
- Large Japanese companies, for their part, must become more willing to cooperate with start-ups, which can be an excellent source of new technology through acquisition or purchase of components.

Is There a Role for Government?

The Japanese government has already taken many important steps to remove regulatory constraints facing start-ups, such as the liberalization of stock options. However additional regulatory change is still needed. According to a World Bank ranking (Table 2), starting a new company in Japan is more complex and costly than in other OECD countries. Compared to its Asian neighbors, procedures in Japan cost less (relative to national income) than in China, Korea, or India but more than in Singapore or Taiwan. The national government should continue to streamline the process and reduce the costs of starting a company in Japan.
Table 2. World Bank Data about the Venture Environment in Selected Countries

<table>
<thead>
<tr>
<th>Number of Procedures Required to Register a New Firm</th>
<th>Total Cost of Procedures to Register a New Firm (% of Gross National Income per capita)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>0.6</td>
</tr>
<tr>
<td>Singapore</td>
<td>1.1</td>
</tr>
<tr>
<td>France</td>
<td>1.2</td>
</tr>
<tr>
<td>Taiwan, China</td>
<td>5.9</td>
</tr>
<tr>
<td>Germany</td>
<td>6.3</td>
</tr>
<tr>
<td>India</td>
<td>10.6</td>
</tr>
<tr>
<td>Philippines</td>
<td>14.5</td>
</tr>
<tr>
<td>Japan</td>
<td>17.7</td>
</tr>
<tr>
<td>Korea, Rep.</td>
<td>19.5</td>
</tr>
<tr>
<td>China</td>
<td>49.5</td>
</tr>
</tbody>
</table>

Valuable support for emerging companies is given by government agencies (and sometimes by the private sector) at a growing number of “incubators” that provide office space, business services, and IT infrastructure. Local and/or prefectural governments are best positioned to evaluate the start-ups that apply for incubator support. The national government should subsidize the local government incubator efforts, rather than directly support individual start-up companies. Since METI has the dual goal of protecting large companies while supporting small companies, this presents METI with a conflict of interest when supporting start-ups that might eventually challenge large companies.

An existing activity that can be expanded to improve the start-up environment at the local and national level is to build networks of executives, both active and retired, who want to work with start-ups. Executives participating in a national or regional registry can help the start-up obtain access to—and structure joint ventures with—the large companies where they have contacts. Retired executives can also provide management advice to inexperienced start-up executives. The development of strong contacts between start-ups and large companies will help early-stage companies overcome the first three difficulties listed above—resources, management skills, and customers.

To help with the fourth difficulty—engineer reluctance to work at start-ups—the government can reduce the obstacles to worker mobility. One possibility is to rewrite the law on pensions to reduce the amount of time for vesting, make pensions more portable, and lower the age for a partial payout. The government might also consider providing a national contribution to the retirement fund for workers under 45 years old. Measures of this type could provide middle-aged workers with private assets to start a new company or to afford a reduced salary in an early-stage company. Educational measures can also help alleviate the shortage of management skills outside the large companies. The development of new business schools that are integrated into global education networks, such as the one at Doshisha University, can develop world-class managerial talent in Japan, since Japanese students have historically been reluctant to study overseas.

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Without a dynamic start-up community, the Japanese industrial engine is missing an important source of innovation. Start-ups, with their low overhead, rapid decision-making, and a potentially diverse customer base, can provide technologies that might not have been developed or commercialized by existing companies. These small companies can be complements to large firms, and one or two may eventually become major contributors to the Japanese economy.
References


Note:
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