

A DYNAMIC MODEL OF CREATIVE TECHNOLOGY

What Matters Most for the Transnational Leadership?

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Introduction

A Dynamic Model of Creative Technology

What Matters Most for the Transnational Leadership?

Recent years have seen a revolutionary boom in the application of electronics technology to the traditional maturing operations. The electronics know-how offers two broad benefits: (1) Manufacturing Power: the functions typically performed by diverse mechanical components can be integrated into a single electronic component. Such integration reduces the risks of product failure, saves the consumption of natural resources, improves the transportability of the products, and enhances the flexibility for adding new functional features to the existing products. (2) Marketing Power: the electronic products can be designed for flexible programmability, and thence used over a long period and across multiple user groups. Several electronic products have a capability to adjust the functional parameters autonomously in accordance with the nature of the application, offer an option to re-program the adjustment heuristic, can suggest alternative feasible re-programming options under varying criteria of costs, speed, or user sophistication, and may learn to be more effective through the independent analysis of diverse user-directed experience over time.

As such, a number of less known firms have been taking a lead in the adoption of electronics technology, and in the process tremendously boosting the value of their traditional firm-specific properties. For instance, Richard Celeste (1996), the Chair of the Government-University-Industry Research Roundtable in the US, observes, "In a recent visit to Navistar, the truck manufacturer, I was struck forcefully by technology's potential to transform product in unseen, but profound ways. Using electronic advancements, Navistar will reduce the number of mechanical components controlling its fuel injection system by a factor of ten, and reduce the injector size by half. Navistar has accomplished this while adding performance and emission control capabilities, and reducing total system costs. The new fuel system already meets 1998 federal emission standards, and a subsequent version will be the key to attaining 2004 emission standards before the turn of the century. The Navistar example shows that high regulatory standards can promote technology and product innovation, spurring companies to adopt new technologies ahead of their global counterparts."

The orthodox models emphasize that the global firms are actively involved in the creation of tacit (difficult to articulate and diffuse), proprietary (non-tradable and embedded in the path-dependent historical routines), and idiosyncratic (complex and having weak links with the dominant market paradigm) properties through sustained research and development. The chaotic nature of global technology makes the adoption of electronics technology a very costly and difficult endeavor. The process necessitates substantial commitments to the specialized human capital, having skills for systematic appraisal and codification of the distinct localized features. Though the electronic wage levels remain far below those of several multinational sectors such as auto assembly, the enhanced application of electronics know-how has been limited by a severe scarcity of required human capital.

One of the reasons for the low electronic wage levels is the fact that the low-wage emerging Asian markets have been key suppliers of the creative electronic inputs. The conventional maturing sectors, in contrast, have been pre-dominantly based on the industrialized high-wage economies. The recent Asian crisis, where the currencies of several Asian nations have depreciated significantly, has further accentuated these wage disparities at the international level. Orthodox economic theory suggests that the Asian currency depreciation would improve the competitiveness of Asian human capital, and therefore increase the cost-effectiveness and adoption of electronics know-how internationally. This theoretical proposition needs to be balanced against the risks deriving from the diminishing cost-effectiveness of mature manufacturing assets. Specifically, the firms in the industrialized nations are under growing pressure to diffuse their costlier assets into the emerging markets, and to acquire prominent local corporations whose assets are now cheaper when valued in international US\$ currency. As the operations in the emerging markets become dominated by the traditional mechanical technologies, which are tacit and non-tradable in nature, the low-wage human

capital will find it very difficult to offer creative electronic services to the transnational firms. At the threshold of the new millennium, there are thus likely to be strong competitive pressures on the reputed multinational firms to offer increasing compensation for the electronic services.

There may be substantial benefits of pro-active strategy. The firms seeking transnational leadership in the new millennium will be in an advantageous position if they go beyond the orthodox market logic, and proactively offer higher compensation for the creative electronic services consistent with the value-added to the traditional mature properties. Instead of attributing all the incremental value to the ownership of non-tradable and tacit resources, the firms will do well to also appreciate the true causative forces that are improving the productivity of traditional assets. A dynamic focus on the path-developing emergent forces as dominant contributors to growing profitability, in contrast to the stagnating path-dependent historical forces, would matter most for the sustained international reputation and transnational leadership on the threshold of new millennium.

The above considerations may be summarized as follows:

History-dependency → Technological Capability → Technological Investment → Technological Trading → Technological Servicing → Technological Exchange → Transnational Leadership

Specifically, industrialized firms have a strong base of history-dependent technological capability. The escalating costs of this capability promote diffusion of investments into the emerging markets. Such diffusion limits the flexibility of trading creative know-how, and motivates the firms to offer escalating compensation for the new technological services. A proactive leadership solution would be to seek exchange of technology at appropriate super-market terms. Such terms would improve the exchange proficiency of the emerging markets, motivate the creative entry of new human capital, and enhance the overall productive value of the international endowments.

This study presents a comparative analysis of the American and Japanese approaches to the market exchange. Over the 1980s, American firms put an increasing reliance on trading creative inputs from the emerging vendors worldwide. Japanese firms, in contrast, used the information spillovers for acquiring substantial equity stakes in the emerging vendors, and in offering significant debt capital to the emerging markets at interest rates lower than that of the international market. While over time, Japanese financial services firms have substantially improved their wealth position, Japanese manufacturing firms found it increasingly difficult to sustain value-added by their firm-specific networks. During the early 1990s, the general pretext held out by the Japanese manufacturers was that the value of yen is too high to support competitive exports from Japan, and to meet the challenges of cost-effective imports. Now, with the value of yen down from 79.25/\$ in March 1995 to an eight-year low of 146.15/\$ on June 15, 1998, Japanese financial services firms are counting escalating risks of bad debts on their domestic portfolios. For instance, the international credit rating for some of Japan's largest construction companies has now been downgraded to the junk bond status. Japanese construction companies have been the most prominent beneficiaries of the several hundred billion dollars of fiscal stimulus injected by the Japanese government into the faltering Japanese economy. Japanese manufacturers, in the meantime, have partitioned into two groups. A group of transnational leaders, who were the early adopters of electronics know-how in design and development of new products, are enjoying super-normal profits on their American investments. The other group, that has been more focused on the localized firm-specific assets, is counting escalating losses on the rapid appreciation of the American fundamentals and of the US\$. Thus an overall strategic survey of the forces accounting for the reputation of the US landscape for being open information-efficient global market, would help prudent re-engineering of the dominant local assets and enhance transnational leadership effectiveness at the threshold of new millennium.

Reference

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