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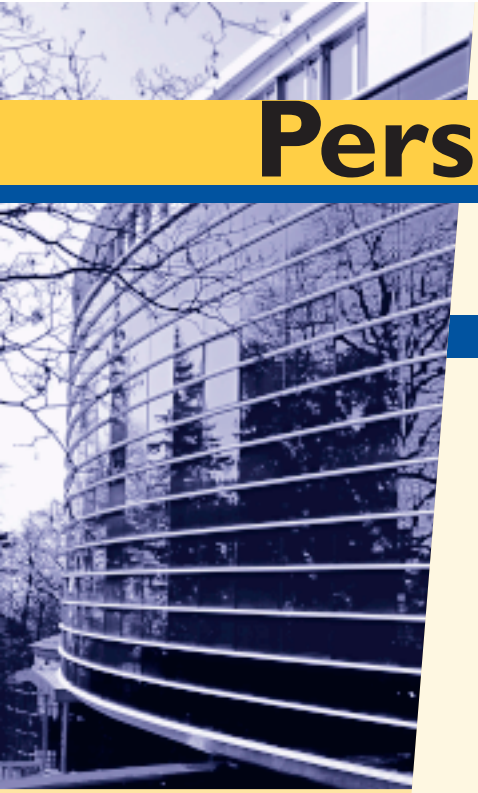

Resolving the Innovation Paradox in Technology Companies

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Technological innovation is crucial for creating value in the marketplace. Investing in today's innovation projects will create tomorrow's jobs. It is universally accepted that innovation is central to the success of technology companies. In spite of this, there is a paradox: few CEOs have as a top priority a striving to make the innovation process more effective in their company. The new approach of distributed innovation is a proactive approach to help top management resolve this paradox and to develop high value-creating offerings.

A turn-around world

We are living in an increasingly interdependent world where change is occurring at a very rapid rate and with great amplitude. This has been particularly true in the years following the economic crisis triggered by the oil shocks in the 1970s. In the course of this period, science and technology have been crucially shaping our world, particularly in the areas of life-sciences and ICT (Information and Communications Technology). Trade and exchanges have grown at a spectacular pace. As a result, technology flows have grown exponentially, as exemplified by the fact that, in less than ten years, the amount of licensing royalties have been multiplied by seven to reach $142 billion worldwide in 2000.

Responding to these changes, business has carried out extensive restructuring. Companies have tended to focus on their core activities and to outsource portions of their operations. When it comes to developing technical innovations, however, firms have been more cautious in adopting a less internally centered approach. It is high time for companies to envisage technical innovation in a new perspective.

Although the phrase "innovation is a key to profitable growth" is universally accepted, most CEOs of technology companies are not truly committed to making sure that the innovation engine works *effectively* in their firm. In order to resolve this paradox, the environment around the CEO must indeed contribute to giving him or her the courage to be a true champion of innovation. Also, as mentioned above, it is high time to envisage innovation in a new perspective. The new approach of *distributed innovation* offers a way to resolve this paradox .

A new perspective on innovation

As they develop innovations, technology companies currently rely excessively on their internal resources. It is proposed that they should extensively access inputs from external actors. This *distributed innovation* approach is represented in **Figure 1.**

The starting point of this new approach is the market. On occasion, the firm needs to identify a 'ground-breaking' or 'high impact offering'- product and services - that will give it a competitive edge by defining its future business. This approach is envisaged in an entrepreneurial perspective: as an entrepreneur, the firm "sees" the opportunity in the marketplace and then mobilizes resources in order to develop it.

Among the required resources is a technological component. In this approach, this component results from combining expertise internal to the firm together with

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extensive input "imported" through various channels from external sources: other firms, start-ups, laboratories, as outlined in Figure 1. In this way, the firm is able to mobilize a much broader technical base and has more options available to define and implement the development of the targeted "high impact" offering.

Samsung, Intel and pharmaceutical companies are examples of this approach. In the case of Samsung, distributed innovation was used, not to develop a given product, but to enter a whole new industry of advanced electronics components in the 1980s. For this, in addition to hiring appropriate staff and developing its own R&D, Samsung bought licenses, entered into co-development agreements and acquired companies. By tenaciously driving this learning process, the company succeeded in becoming a world leader in DRAM - Direct Random Access Memory chips.

In the case of Intel, the company uses two main channels to "import" technology: collaboration with universities and corporate venturing. Intel invests $4 billion per year in internal R&D. It also maintains a number of projects with universities: this effort represents $100 million per year. Intel is particularly attentive to effectively leverage these collaborations: an R&D person is assigned to each project, in order to monitor it, as well as to make sure that its findings are utilized by the company. When it comes to venturing, Intel is the largest venture capital company in the USA. Intel Capital has a portfolio of some 500 investments in companies that will support the development and use of Intel's products. Intel calls them "ecosystem investments".

Of all industrial sectors, the pharmaceutical industry has pioneered the extent to which companies can leverage external technical expertise. Johnson and Johnson, in particular, has been successful in the delicate process of "internalizing" external innovations. More generally, pharmaceutical companies heavily complement their own drug development efforts by channeling external expertise. They invest in start-ups; 18 in the case of Novartis in 2001. They also secure "windows on technology" by financing funds which invest in start-ups and engage in extensive in-licensing and collaborative developments. It is estimated that, by 2010, some 40% of all pharmaceutical development will be "outsourced" to third parties.

These examples highlight some of the channels constituting the "distributed innovation system". In the case of Samsung, partnering and acquisitions were used

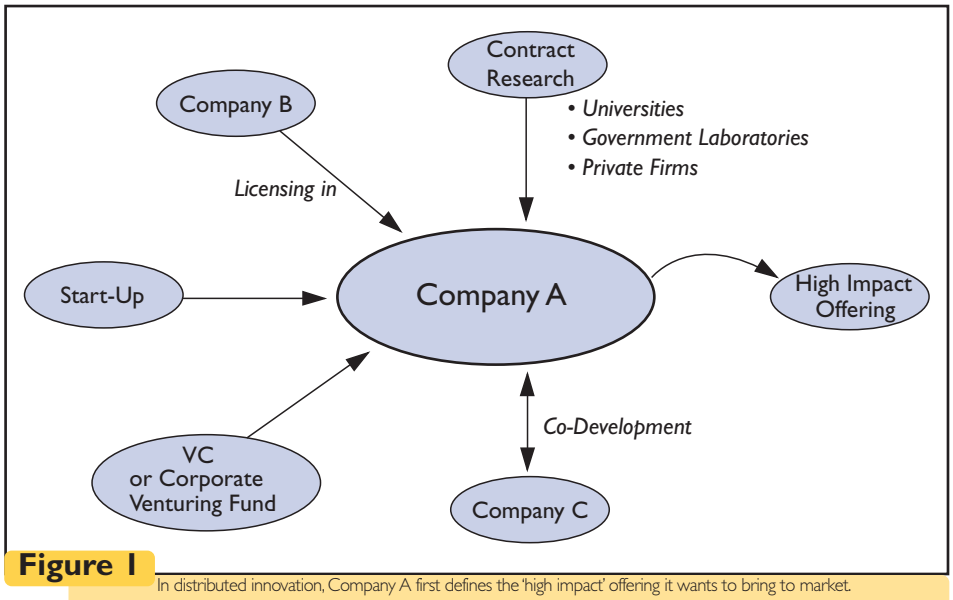

Figure 1

In distributed innovation, Company A first defines the 'high impact' offering it wants to bring to market. In order to develop this offering, the company then extensively draws on external technical resources from a variety of sources.

exceptionally in order to acquire the expertise needed to build a new business. Intel taps into external sources of technology essentially through the channels of university projects and venturing companies. Pharmaceutical companies make use of a broad range of channels.

In none of these cases, however, do we have a bundling of external inputs together with internal capabilities in order to more effectively develop a pre-defined target offering. These examples thus do not truly represent the practice of distributed innovation, which implies the proactive, coordinated channeling of external expertise, aimed to develop 'high impact' offerings.

Although today very few companies practice distributed innovation, technology companies will, no doubt, increasingly apply this model in the future. The reason is simply that, alongside their internal innovation process, this approach allows firms to more effectively leverage technical expertise to secure better options for developing offerings with enhanced potential for value creation and growth.

Practicing distributed innovation

In order to practice this new approach, several requirements must be met. The main ones are:

- At the center of the process, the CEO must take the responsibility for identifying and selecting the project, as well as developing it. He or she must be seen as having the courage to take the risks involved.
- Scanning the external environment must be particularly effective. Beyond the traditional techno-business watching, the firm must gather intelligence helpful to identifying the groundbreaking offering. It must also be very aware of external sources of technologies that may be available.

- Project leadership: "seamlessly" intergrating external and internal contributions is more complex than managing a predominantly internal process. The development of sophisticated project leaders is thus an even more critical requirement than at present.
- Knowledge management: far from being immune to external inputs, the firm must have a strong capacity to scout, locate and absorb knowledge from the outside. This in turn demands that internal knowledge is well managed, including a clear policy on what leading-edge knowledge must be maintained within the organization.

Underlying most of these requirements is the fact that the staff, particularly the technical knowledge workers, will thus develop a highly outward orientation: towards the market, potential sources of technology and possible partners. Such characteristics will be increasingly important to the success of firms in the future.

The way forward

A primarily internally focused innovation process is too constraining. What is needed is to engage external contributors much more proactively. Technology firms have to considerably extend their *innovation perimeter*. They must create a seamless connection between internal and external actors in the innovation process. This must be done for specific, carefully selected projects critical for the growth of the company.

Until now, outsourcing of technology has often been done in an opportunistic way and in a piecemeal manner. What is now needed is to *outsource with a clear purpose*. Marshalling the various inputs, external and internal to the firm, aims to provide the best possible technical toolkit for the commercial success of 'high impact' innovation projects.

The inputs of external technology flow through various channels. License-in technology from third parties. Buying innovation projects from other firms or laboratories. Investing in a start-up to access its valuable technology. Activating additional external channels as well. These include university laboratories - be curious about their research to stimulate your own - as well as relevant contract research organizations. Monitor their activities to see where they can

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contribute, as they may be able to add other pieces to complete your technology puzzle.

By working towards the distributed innovation model, companies will more effectively leverage external technical expertise for commercial success. This 'high risk, high reward' approach provides new options for effective value creation and growth. Distributed innovation truly takes into consideration the fact that there is much more going on outside the firm than there is inside. It involves fusing external and internal inputs "seamlessly".

The entrepreneurial perspective of this approach is what is needed in technology companies. The world of corporate technical innovation has been fairly impervious to the discipline of value creation characteristics of the Venture Capital (VC) industry. The VC perspective, applied to the 'high impact' projects, is fully consistent with our objective of strong, profitable business growth over the longer term. With it comes the useful notion of *due diligence* to evaluate innovation projects, as well as assessing external technical input. It is time to inject such a perspective into the way technology companies approach the innovation process today.

With distributed innovation, the company's main actor in technical developments, the R&D - Research and Development function, increasingly acts as a *broker* of technology. This implies a schizophrenic dimension, since technical professionals working on internal developments may recommend that their firm buy a technology, which might make their own obsolete. This creates yet another tension in the management. In making distributed innovation work, it is particularly crucial that top management handles the human factor with great care, not only to maintain the conditions for a high motivation level, but also a strong atmosphere of trust.

Because it relies so much on scanning and evaluation of the external environment, distributed innovation will powerfully reinforce the outward perspectives of the staff in the firm. It will also constitute a great stimulus for *learning*.

Above all, distributed innovation is an occasion for the CEO to facilitate a process enhancing the value creation for the firm. It is the key to resolving the innovation paradox. Technology companies will thus increasingly become *architects* of innovation. In this way, they define their target product developments with fewer constraints than if they mainly rely on what they can do in-house.

Companies will continue to need the strong technical expertise of the internal R&D function. First, it will play a key role in driving innovation projects, those using distributed innovation, as well as the more traditional, internal ones. Second, such a strong function is needed to enable the firm to be an effective scout and buyer of external technology.

By extensively opening their innovation system to external actors, technology companies will unleash new potential for growth and job creation. They will thus more effectively convert the large pool of existing technical knowledge into economic value.

This article provides some highlights from the latest book by Professor Georges Haour. Entitled "Resolving the Innovation Paradox-Enhancing Growth in Technology Companies", the book is published by PalgraveMacmillan. For more information, see www.innovationparadox.com.

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