Is your Innovation Process Global?

by

Y. Doz
J. Santos
and
P. Williamson

2004/09/SM
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Your company’s supply chain is probably already global. Starting out with global sourcing, many companies then moved their basic manufacturing to low-cost locations overseas. More and more companies have now begun transferring their support services and customer call centres to lower-cost countries.

But is your innovation process equally global? In most companies the answer is a resounding “no”. It’s true that many companies have R&D centres or product development teams scattered around the world. But more often that not, each of these units is focused on leveraging the knowledge available on their doorstep. Even so-called “centres of excellence” tend to be dominated by the thinking and technologies available in the countries where they are located. Innovation activities seldom integrate distinctive knowledge from around the world as effectively as global supply chains integrate far-flung sources of raw materials, labour, components and services. And the units responsible for innovation in most companies are often poorly equipped to cut the cost of innovation by accessing knowledge from non-traditional locations where it is cheap to obtain.

However, there are some companies that have managed to piece together a globally integrated “innovation chain”. They have been able to implement innovation processes that transcend local clusters and national boundaries, becoming what we dub “metanational” innovators\(^1\). This strategy has given them a powerful new source of competitive advantage: more, higher-value innovation at lower cost\(^1\). It is the logical next

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\(^1\) We use the prefix *meta*—from the Greek term for “beyond”—to emphasize a key point: Metanational innovation is not based on leveraging advantage from a single national or home country innovation cluster. Metanational innovation draws from a world canvas dotted with localised pockets of technology, market intelligence, and capabilities to exploit the potential of truly global innovation.
step beyond augmenting in-house R&D with external ideas in what Henry Chesbrough recently described in this Review, as the “era of open innovation”ii.

To see potential competitive benefits of globalizing innovation, compare the performance of the following pairs of companies:

<table>
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<th>National Innovators</th>
<th>Metanational Innovators</th>
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<td>Motorola</td>
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Motorola was a pioneer in cellular phones, building of the initial path-breaking research in Bell Labs. By deploying US technology to match the needs of customers in the US market it came up with a string of incremental innovations based on its analogue technology. But its failure to globalize its innovation process led Motorola to miss the shift to digital mobile technology and the growing strength of the European GSM standard, it didn’t see the potential to turn the phone into a fashion icon, it was slow to take on board the new ways mobiles were being used and to recognise that a broader, but more fragmented user base would spell the end of “one-size-fits-all” products.

Newcomer Nokia, by contrast, became an early metanational innovator. By combining its observations about what appealed to trendy customers in Asia with design skills drawn from Italy and California, it was able to turn the mobile phone into a fashion accessory. By researching customers in Europe where different segments of users first began to emerge, it was among the first to recognise that deploying digital technology could generate innovations that would dramatically improve the functionality of mobile phones and pave the way for customised handsets. By extending its innovation process into China and India it saw that mobile phones could potentially substitute for a fixed-line network if it could use it Finnish engineering capabilities to find innovative ways to get
the costs mobile telephony down. Nokia became world leader in the market for handsets and Motorola continues to struggle to keep up in the innovation race.

McDonalds built a global business empire by perfecting the processes for delivering fast food through franchisees – areas where American know-how and experience is second to none. But at the core of its innovation process was to innovate in the US and then roll out new products and processes around the world. Its operations were impressively global, but its innovation process was doggedly local. Part of the company’s growth difficulties today are arguably the result of this narrow innovation process running out of steam with product launches and process improvements constrained by the orthodoxies deeply rooted in its American heritage.

Compare this with Starbucks that innovatively applied McDonalds-like model to the market for coffee, but instead of restricting its sources of innovation to the US, it combined diverse pools of knowledge: the concept of the café and for the technology of espresso coffee roasting from Italy, with knowledge of multiple retailing, service delivery, efficient logistics, and staff training and incentive systems from the US.

Boeing’s strength in the market for civil aircraft can be traced back to the 707, an innovative airplane that helped shape commercial aviation as we know it today. It followed with a stream of aircraft devised in the same way: local technologies put together to serve the needs of the major carriers in the US. With superior technology and designs its planes also sold well outside the US. Ultimately, however, its global supremacy fell victim to a group of European companies that innovated in a very different way: Airbus airplanes are designed to take advantage of diverse sources of expertise and bring them to an integrated family of products. This includes the fact that different European countries excel in particular technologies (e.g. wing aerodynamics in the UK or avionics in France), while other inputs into the innovation process must be accessed from afar (such as “fly-by-wire” know-how incorporated into the Airbus innovation process, a technology that was long used in jet fighters in the US) and the
different needs of carriers serving regional markets with a diverse route economics and service expectations.

Computer Associates is a leading company in software and related services, able to reap all the benefits of scale and technology of its American home. But it lost ground in the global market to SAP. Despite being a German company, SAP’s innovation process harnessed hardware and software technologies from around the world and leveraged market knowledge drawn from a far-flung group of early, foreign customers – including Britain’s ICI and US Chevron Oil – to shape products capable of coping with national differences in accounting conventions and the urgent need of its multinational customers for cross-border integration of financial data.

ARM, a start-up in the UK, created design architectures for RISC chips by combining the technologies, manufacturing capability, and application know-how of a web of over 60 alliance partners from every corner of the globe, including companies such as Nokia, Texas Instruments and Samsung. Its metanational innovation process enabled it to become the de-facto global standard for RISC chips, with over 70% market share in applications such as mobile telephony. No single company, drawing the raw material for innovation from a single cluster – even its Silicon Valley-based competitor MIPS – could match ARM’s unique ability to craft designs that optimised tradeoffs between the diverse performance needs of OEMs and semiconductor fabricators scattered around the world.

Finally, the British record company EMI focused on identifying up-and-coming artists in the two, main sources of new repertoire: New York and London. It built a global business based on selling new albums by these artists in every corner of the world. Competition to sign up new acts in these traditional hotspots, however, successively undermined its profitability. Its arch rival, Polygram (originally the record arm of Philips Electronics and now part of Universal), meanwhile, built a metanational process that took local talent in countries as diverse as Iceland (home of pop idol Bjork), Italy and Venezuela, and reshaped it using its knowledge of global marketing, PR and the behaviour of disc jockeys around the world to create potential global hits. By looking beyond the traditional
capitals of the music industry for innovative repertoire it had become the world’s largest record company by the time it was sold to Universal for a $10 billion price tag.

By globalizing their innovation processes, all of these metanational innovators created new sources of value and long-term, strategic superiority over their competitors.

Of course it is still possible for some companies to succeed by confining innovation to their home country or even by focusing its innovation on a single knowledge cluster. Intel is a case in point. With the bulk of the knowledge it needed located in Silicon Valley and enjoying a strong technological lead over its competitors, it was able to win a dominant share of the global market for standardised semiconductors -- first in memories and then in microprocessors -- for personal computers and workstations. It decided not to pursue opportunities such as car electronics that would have required a more dispersed approach to innovation.

This strategy of innovating locally and then delivering these innovations efficiently through a global supply chain, had clear attractions. Frequent and informal interactions between the various parties were relatively straightforward – at most a matter of half an hour’s drive to a meeting. The necessary knowledge was mostly available in the heads of people who shared the same language and understood the local context of chip development -- everything from implicit roles and responsibilities to accepted development cycles. Moreover, it meant that until 1998, Intel’s corporate venture fund could confine its investments designed to intercept potentially interesting new technologies to the US alone.

But despite its strategy of centralizing innovation in the “capital” of its industry and sourcing the vast bulk its new technology from the US, even Intel found it had to access a certain amount of knowledge from overseas. Some of the wafer lithography technology Intel used, for example, came from Japan. Communication technologies were being developed in Israel where, serendipitously, Intel had a budding design centre. Intel also began to recognize that it was missing out on important developments because it was
casting the net for new technology to fuel innovation too narrowly. Today Intel’s corporate venturing fund has investments in over 20 countries, helping it access new technologies from right around the world.

Intel’s change of thinking about the potential benefits of a more global innovation process was probably influenced in part by seeing ST Microelectronics move from a struggling amalgam of French and Italian government-owned semiconductor manufacturing organisations to become a leader in the world of semiconductors by following the metanational innovation strategy.

ST’s break came when it decided to differentiate its offering by innovating “systems-on-a-chip” – such as the new chips it developed to replace the traditional circuit boards used to control hard disk drives. But when ST began to develop this innovation, it recognized that much of the technology it would need was scattered around the world both inside ST’s subsidiaries and outside the company. Its internal digital engineering expertise, for example, was in Grenoble, France, while the knowledge of the power system was in Castelletto, Italy. The know-how to handle the signal coming from the reader head in a disk drive was in a couple of specialty boutiques in California, while the in-depth understanding how to optimize the design and production of disk drives was fragmented across the subsidiaries of its customers (multinationals like Seagate and Western Digital) in yet other locations in the US and in Singapore. To have a chance of innovating a system-on-a-chip, ST it needed to assemble relevant knowledge from different sites and product divisions scattered around its own international network, from competitors, and from customers.

If it could create an innovation process that would harness the power of this diverse, but complementary bundle of knowledge, however, it would have the opportunity to come up with a breakthrough that its competitors, relying on localized innovation, would find virtually impossible to copy. Ultimately, ST succeeded in creating global innovation chains to improve a range of data storage devices as well as many other applications (including computer monitors, telecommunication, car navigation systems and digital
cameras). Its innovation processes were able to integrate knowledge from customers in places as diverse as San Jose (in California), Tokyo, and Helsinki, with pockets of technical expertise scattered from Grenoble to Milan, Noida (in Uttar Pradesh, India), Ang Mo Kio (in Singapore), and Carrollton (in Texas). The capability to harness this diverse set of specialist knowledge allowed it to achieve something that eluded its competitors: to create very efficient solutions for several applications by incorporating dozens of specialized circuits involving different process technologies on single silicon chips.

**Harnessing the Potential of Diversity**

Key to ST’s success has been its ability to harness the power of diversity to generate a stream of innovative chip designs that are optimised for the needs of different applications. This critical role of diversity in stimulating innovation is hardly surprising once we recognise that an innovation generally results from the novel combination of existing pieces of knowledge.

Despite the common perception that innovation involves blue-sky creativity, most innovations actually stem from combining existing technologies and expertise in new ways. In fact the literal definition of innovation is: “making changes to something established”iii. The probability that such changes will emerge from a group of people churning through an identical, existing pool of knowledge is remote. Much more likely, innovation will be sparked when bits of knowledge from a diverse heritage interact. New, on-line banking products emerged, for example, when hitherto separate streams of knowledge about financial instruments and markets, IT and communications technologies, electronic security systems, and tax regimes came together. The same is true for well-known innovations like the “Post-It” which was the outcome of combining 3M’s existing knowledge of the adhesion technology with recognition of an unsatisfied need when one of its scientist, an amateur musician, had become frustrated with the lack of any easy way to put temporary notes on his music scores. This serendipitous
combination of knowledge from diverse spheres of human endeavour – adhesive technology and music – was the critical prerequisite for the innovation that emerged.

It’s not the random combination of existing knowledge, however, that leads to successful innovation. As most executives are well aware, valuable innovations stem from new combinations of technology and market insight. There is a litany of failed innovation based on novel technologies that ignored the realities of the market. Both the supersonic Concorde and the satellite telephone system Iridium, for example, were great technological feats, both products incorporating a myriad of pieces of “technical knowledge” of the utmost excellence. But they were also causes of acute embarrassment and waste of money, as the understanding of customer needs, of substitutes, and of competitive dynamics on which these innovations were based, proved inadequate. The Concorde and the Iridium failed because of the poor quality of the “market knowledge” that was used to conceive them. An innovation process capable of accessing the right knowledge about the behaviour of global markets is clearly critical to success.

The success of an innovation process will be further enhanced if we are able to assemble the best combinations of technical and market knowledge available anywhere in the world, rather than only the knowledge available in a local cluster. Just as the performance of a hi-fi system is limited by the quality of its weakest component – often the loudspeakers – the probability of successful innovation will be limited by the weakest source of diverse knowledge. Globalizing the innovation process, therefore, is likely to improve the quality of the new combinations of knowledge from which innovations arise, as well as adding to the diversity that sparks them.

Finally, the benefits of an innovation process that can access diverse types of knowledge are becoming greater as markets become mature and hence maintaining differentiation from competitors becomes the a key issue. As the market for personal digital assistants (PDAs) has matured, for example, players like Palm have had to draw on increasingly diverse types of knowledge in order to maintain their lead. In addition to the technology and market knowledge incorporated in the early Palm Pilot (and Handspring – now part
of Palm) designs, the successor Treo line had draw on a diverse raft of additional knowledge ranging from wireless communication technology to phone ergonomics and energy management of new, power-hungry applications. Similarly, as companies attempt to create value by providing “solutions” rather than stand-alone products and services, they will need to feed their innovation processes with more diverse types of knowledge. These will include a subtle understanding of the myriad of different (and often unarticulated) needs customers face depending on their own market environment and organizational structures and processes, as well as knowledge of a broader range of technologies and how they can best be integrated.

Accessing sufficient diversity of knowledge is therefore a key challenge for the innovation process to deliver successful results. After all, if all those involved shared identical experience, innovation would be heavily circumscribed; and if competitors all fished in the same knowledge pool, “me-too” initiatives would likely result.

**Globalising Innovation Promises Higher Value**

Globalizing the innovation process is an important way to access greater diversity of knowledge. Certainly putting together a local team made up of people of different gender, with training in different disciplines, and with different perspectives on a business problem (such as vendors and customers may bring) can enhance the diversity of knowledge on which an innovation process draws. But if they all share a common geographic context, knowledge diversity will necessarily be constrained. Much of the way we think and the knowledge we bring to bear on an opportunity is influenced by both where we are from and the local environment in which we work.

At one level, the fact that globalizing an innovation process allows it to harness a more diverse set of knowledge is obvious. Climatic conditions, for example, lead to local differences in knowledge about everything from heating and cooling through to the preparation of different foodstuffs. In other cases the relationship between knowledge diversity and geography may not be immediately evident. For example, the high cost of
installing and maintaining fixed telephone lines and the need to be able to contact emergency services from isolated places in Finland – with its combination of harsh winters and low population density – gave early impetus to accumulation of knowledge about radio telephony. Cultural and political differences, leading to a strong “green movement” in Germany, meanwhile, has led to accumulation of distinctive market and technical knowledge in areas like re-cycling and renewable energy. National culture fosters knowledge of different ways to solve problems (such as improvisation in Brazil, flexibility in Italy, radical new solutions in the US, or irreverence in Australia). In Japan, a combination of consumers’ attention to detail, high cost of land and intense rivalry among competitors forced companies to accumulate knowledge in a range of areas from quality assurance and “just-in-time” production systems that minimised inventory through to insights into the innovation process itself – such as how to advance through a series of rapid cycles of incremental improvement. The large US market, unified by a common language and an efficient transport system has encouraged firms to accumulate knowledge of mass production; while Europe’s fragmented market has tended to promote expertise in how to handle high levels of variety or, as we noted in the case of SAP, the how to build enterprise integration software.

Clearly therefore, globalizing your innovation process can play an important role in harnessing a more diverse set of knowledge inputs. And we have already seen that greater diversity, in turn, increases the likelihood both that an innovation process will deliver differentiated new products, services and processes and that they fit a range of market need beyond those of local customers. In some industries, however, accessing distant pools of knowledge will not only be desirable, it will be essential for long-term survival.

The shift in the locus of critical knowledge in the computer industry from Route 128 near Boston (birthplace of companies like Wang and DEC) to Silicon Valley is a microcosm of this survival effect at work. Companies based on the East-coast that failed to access knowledge in across the other side of the continent in California and feed it into their innovation process fell behind; eventually they were either taken over or went bust.
Today that same imperative to harness new pools of geographically distant knowledge is happening on a global scale.

Take the example of pharmaceutical companies like Novartis and GlaxoSmithKline. The knowledge they require now extends far beyond traditional chemistry and therapeutics to include disciplines like biotechnology, genetics and the use of advanced computers and robots in the drug discovery process. But much of this new knowledge emerged from different roots. Therefore it isn’t to be found next door to their traditional R&D labs in Basel, or Bristol, or New Jersey; instead it is often located on the other side of the world – in California, Tel Aviv, Cuba, or Singapore. As a result, for these pharmaceutical giants, globalization of the innovation process has is no longer an “optional extra”, it has become an imperative.

This dynamic – the increasing dispersion of the knowledge needed to fuel innovation -- is now occurring in more and more industries. In part it is a logic outcome of the globalization of supply chains. As companies use contract manufacturing located outside traditional clusters, the sources of new knowledge that flow from manufacturing process improvements will also become more dispersed. Today, for example, Taiwan has some 60% of the world manufacturing of notebook computers, and a whole spectrum of PC components and peripherals. Although the product concept and core technologies may have originated in California, Boston, or Texas it is inevitable that new knowledge about the manufacture, engineering and design of these computers has been created in Taiwan.

Likewise as multinational transfer knowledge to new locations through their subsidiaries, new pools of competencies will develop. As a result, the pools of specialist knowledge a company could usefully access for innovation becomes more dispersed. When Hewlett Packard moved its process engineering skills to Singapore to manufacture calculators, for example, it set off a chain of events where the engineers there began to alter the calculator designs, gradually building a design competence which was then applied to keyboards and eventually to the complete design of inkjet printers, so that a new competency pool emerged on the other side of the world. While Silicon Valley often hits
the headlines as the fount of new knowledge in IT, there are now many recognised hot-spots in the world (such as Austin, Texas; Bangalore, India; Cambridge, England; Helsinki, Finland; Seattle, Washington; Singapore; Tel Aviv, Israel; or Tokyo, Japan) with the unique technologies and market intelligence that companies in the industry need to tap into for innovation.

Random breakthroughs are also a background driver of increased dispersion of knowledge that can enhance innovation because new technological breakthroughs still have a large element of serendipity. But these breakthroughs don’t always occur in the strongest existing clusters or locations with the most resources devoted to a particular problem. For example: In early 1997, the world was amazed by Dolly, a lamb cloned from the DNA of an adult sheep mammary: Dolly was “created” by researchers in Edinburgh, Scotland – not the most obvious source of a breakthrough in genetic engineering.

The metanational innovators we identified earlier have successfully leveraged the opportunity generated by this increasing dispersion of relevant knowledge by globalizing their innovation processes. Recall that extending its innovation net to draw in knowledge from a diverse set of overseas markets allowed Nokia to come up with innovations such as the cellular phone as a lifestyle symbol for teenagers, not just a communication tool for mobile professionals. Airbus came up with innovative, modular designs for its family of aircraft and first introduced fly-by-wire technology into civil airliners by finding ways to integrate technical knowledge from throughout Europe and the US. Starbucks created its unique formula by combining knowledge from the traditions of Italian family cafes with American know-how in the design and management of fast food chains.

Harnessing the diversity by accessing clusters of different knowledge scattered around the world promises higher value from your investments in innovation. This is analogous to one of the benefits that companies gained when they globalized their supply chain -- access to raw materials, components, or services that were uniquely available elsewhere.
in the world. Likewise the main reason for globalizing the supply chain – to reduce costs – also applies to the globalization of innovation processes, albeit to a lesser extent.

**Globalising Can Help Reduce the Cost of Innovating**

Even if the knowledge you access overseas is similar to that available at home or close to your existing operations, it may be cheaper. ST found the skills for designing the digital controller portion of its first system-on-a-chip in Ireland, a pocket of expertise left behind by the closure of DEC’s former activities there. ST also took advantage of the fact that it could access knowledge of semiconductor packaging technologies more cheaply in South-east Asia than in Europe or the US West Coast. But other types of knowledge were missing in these locations. Indeed, in most cases it isn’t sensible simply to relocate innovation activities “lock, stock and barrel” to a lower-cost location because these lower-cost locations typically lack the full complement of types of knowledge necessary for effective innovation. This means that successful innovation will often require that the lower cost knowledge be moved (through a carrier that may range from the Internet through to the relocation of key people) and integrated with complementary knowledge available elsewhere. Historically the high costs of moving almost any type of knowledge across the world more than outweighed the potential to access lower cost sources. But improved IT and communications technologies and the falling real cost of air travel are now opening up the potential to reap net cost savings by globalizing the innovation process, as well as the supply chain.

In contrast to the globalization of supply chains, cost reduction probably remains a secondary reason for globalizing innovation. None the less, it can still be an important way of augmenting the basic benefit that comes from adopting a metanational innovation strategy: more and higher-value innovations.
Tapping Into the Metanational Innovation Opportunity

In order to reap the benefits of metanational innovation, your company must successfully address three main challenges:

1. Finding pockets of knowledge scattered around the world that could contribute to your innovation goals (successfully “prospecting” for relevant knowledge)
2. Assessing the value-cost ratio including an additional location (determining the optimal “footprint” for a metanational innovation process)
3. Mobilising the knowledge (finding cost effective mechanisms to move distant knowledge without destroying its integrity).

Prospecting

Because the types of knowledge with the greatest potential contribution to innovation are those that add diversity to your existing know-how they are likely to be found in places outside the well-trodden paths of your existing R&D or product development networks. Fishing new knowledge in the same pools as your competitors is also likely reduce your chances of finding something that stimulates an innovation that puts “clear blue water” between you and your competitors. Its difficult to avoid the fact, therefore, that finding valuable new pockets of knowledge to fuel innovation is a bit like prospecting for a new seam of gold. Prospecting involves three decisions: what to look for, where to look for it, and who might provide a fertile source. (See Figure 1).

The Japanese cosmetics company Shiseido, for example, coming from a home base with no experience in fragrance products, recognized that a key to global success was knowledge about how to develop and market successfully luxury fragrance brands. When it set out to achieve this goal, Shiseido couldn’t specify the precise knowledge it was
looking for – it simply didn’t know enough about the perfume business. So it entered the prospecting cycle illustrated in Figure 1 by deciding first on “where to look”: Shiseido hired the former marketing manager of Yves-Saint-Laurent Parfums and created a stable of innovative products run from Paris, backed by leading designers Issey Miyake and Jean-Paul Gaultier, and made in a plant Shiseido built in the town of Gien, in the French perfume “cluster”. It also identified and hired a few remarkable cultural integrators, such as a designer from Brittany who lives in an island in Northern Japan and designs bottles for Shiseido.

When ST began its quest to create system chips, it didn’t know exactly what knowledge it would need, or precisely where to look. But its management presentations at the time were replete with references the tremendous opportunity to combine its “silicon knowledge” with leading customers’ “system knowledge”. ST began by targeting who might have the systems knowledge it needed to build its “system on a chip”: potential lead customers like Seagate. Early discussions with these customers helped ST define more precisely what it needed to sense. Armed with this understanding it was able to identify where the knowledge might be found inside Seagate’s global network, within ST’s own multinational organization, and from locations outside either of these networks.

![Figure 1: Global Prospecting For New Knowledge](image-url)
PolyGram, by contrast, entered the cycle with a guess as to where it might find the new talent from which it could fashion a global hit record. At the time, for example, there seemed to be an active group of young artists producing innovative music in Venezuela and Italy. PolyGram didn’t start with a profile of the type of artist it was looking for, but by choosing a set of likely hotspots for musical innovation. It eventually homed in on the who (choosing an artist with global potential) and the what (finding suitable repertoire).

A common thread among all these examples, however, is the fact that they approached the task of prospecting for new knowledge to fuel innovation with determination and focus, rather than relying on pure chance. Sometimes the opportunity to harness distinctive knowledge from a new location is discovered by accident – perhaps by the CEO or an executive during a trip to far-flung operations or even during vacations abroad. Prospecting is partly a matter of “turning a sufficient number of stones”, so it is important for senior executives to keep a sharp eye for unexpected sources of knowledge as they travel the world to attend routine meetings like operations reviews. But as Thomas Jefferson aptly put it: “I’m a great believer in luck, and I find that the harder I work, the more I have of it.” A concerted campaign of knowledge prospecting can improve the chances of success.

Take the case of Timken, a world-leader in roller bearings. The company launched a specific initiative designed to improve its capabilities in prospecting for new knowledge. A key element was to establish a small team led by a seasoned executive that play the role of “roving reporters”, charged with identifying and assessing out pockets of emerging technologies or new customer applications, and build a network of contacts that will keep the company informed about new knowledge that might help fuel innovation ahead of its competitors. Other companies have used their corporate venture fund or links with the venture capital community to intercept promising new technologies emerging around the world (recall the recent initiatives at Intel). Meanwhile, establishing a carefully planned network of alliances involving lead customers, suppliers, universities and research institutes, or even competitors in various parts of the world can be an
invaluable aid in prospecting for new market or technical knowledge.

For prospecting to be effective in fuelling the innovation process, however, it is essential to have an open mind as to where new knowledge that might stimulate innovation might be found. In most companies, knowledge about markets and technologies drawn from the corporate headquarters or the largest and most profitable subsidiaries tends to carry most weight in the innovation process. But diverse knowledge is probably most likely to come from the periphery of an organization where very different environments engender different technological breakthroughs and market behaviours. Would you think of looking to Sao Paulo in Brazil, for example, not just for samba but also to find world best-practice in internet banking? Yet a series of local factors including a history of hyper-inflation that makes it essential for financial transactions to be settled as quickly as possible, security concerns associated with cash, and concentration of the market in hands of a few large banks have propelled Brazil into the forefront of internet banking. Would you adopt the views of your distributors in Mexico as the guiding principle for creating an innovative personal computer to conquer the world market among small businesses? This probably seems far-fetched. But it was exactly this knowledge that led Taiwanese computer giant Acer Inc. to create a product that appealed to the market among cost-conscious entrepreneurs the world over.

Even once you have identified potentially valuable new knowledge, however, incorporating it into your innovation process is not without additional cost – especially if it must be accessed from a remote location, far away from your existing operations. Within the overall thrust of globalizing innovation there will be some ideal “footprint” that represents the optimal number and dispersion of locations it pays to involve.

*Deciding on the Right “Footprint”*

How “global” should the process be, that is the ideal “footprint”? If we are to design a new chipset for mobile phones, should we access knowledge from Silicon Valley, Austin,
Hinschu, Seoul, Bangalore, Haifa, Helsinki, and Grenoble? Or restrict ourselves to two sites in the US and one in Europe?

This question is not fundamentally different from the trade-offs managers face daily in managing a global supply chain. Adding a new location may reduce the price at which a component can be procured, but it will also increase the costs of logistics and coordination of the chain. Likewise involving any new source of knowledge, be it a R&D lab, a university, or a customer’s site, may bring an added value to the innovation -- such as a novel technology or a superior understanding of future needs of consumers – but it will also increase the cost of running the innovation process.

This cost-benefit trade-off arises from the fundamental fact that, as we have already explained, the diversity of knowledge captured by an innovation process tends to rise with the number and dispersion of sources of knowledge it taps into (See Figure 2).

The optimal footprint will depend on the slopes of the value and cost both curves. However, intense care must be taken in assessing where this optimum lies. Introducing locations with significantly different cultures for example – something that is often viewed as a “curse” to be avoided in designing in global operations – may actually be an advantage in globalizing innovation because they fuel diversity that is the lifeblood of innovation.

In general the impact of extending the innovation footprint will be less certain than expanding the set of locations involved in a global supply chain. Like the results of innovation process itself, the slope of the value curve is inherently uncertain. Broadly, the more dispersed (and hence probably more diverse) the sources of knowledge an innovation process taps, the greater the chances it will deliver major innovation that competitors find disruptive and difficult to match. Meanwhile, the cost curve is easier to predict: it will rise quickly as greater dispersion complicates the process of mobilizing and integrating diverse knowledge from multiple sources, each with a different local context.
Mobilizing the Dispersed Knowledge

Once an appropriate footprint is established for your company’s metanational innovation process, the next challenge is to mobilize and integrate the knowledge from different locations.

For some types of knowledge – that which can easily be codified and readily interpreted even by those working in a different context far away from its source – mobilization is relatively easy. Technical blueprints or patents are a case in point: the knowledge they
represent has been highly codified in a language that enables the message to be readily and unambiguously transferred to engineers or scientists with similar training, even if they are working in another corner of the globe. Other types of knowledge are easily mobilized because they can be embodied in machinery or equipment that can be physically transported. In the terminology of knowledge management, these types of knowledge are labelled “simple” because they are easy to move (despite the fact that they are often incomprehensible to a lay person).

Much of the knowledge that is potentially most valuable for innovation, however, will have characteristics that make it very difficult to move, especially when the recipients who need to use it don’t understand the local context in which the knowledge was originally generated. Image asking a Japanese car designer sitting in Nagoya to design an innovative vehicle that would perform well and be fun to drive on a German autobahn in the winter at speeds close to 225 kilometres (150 miles) per hour. You could provide the engineer with a mountain of reports concerning the behaviour of German car buyers, she could collect plenty of competitor data through the Internet, you could supply her with a wealth of technical data on alternative components from transmissions to braking systems. But would the transfer of all this sort of knowledge make you confident that the designer would come up with a winning innovation? Probably not! This is because, despite modern IT and communications technologies, key elements of knowledge required to do the design job would have been left behind in Germany – such as the behaviour of other drivers on the autobahn and what it “feels” like to be driving on a snow-covered road at high speed for considerable distances.

It would be very difficult to move this second category of knowledge to Japan in a way that a local designer could successfully work with it. To really understand, you would need to experience driving a car in the context of a winter autobahn with German traffic. Even the experience of a test track in Nagoya with simulated snow wouldn’t come close to achieving a real appreciation of the market needs and how different technologies might perform in the German environment. We refer to this kind of tacit, context-dependent knowledge as “complex”, because it is difficult to move across the world.
Most innovation projects will require a combination of some knowledge that is simple to move and other pieces that are extremely complex to mobilize. To make a metanational innovation process work, therefore, will demand a mix of mobilization strategies. One approach to finding the right ways to mobilize different types of knowledge required to make an innovation project fly is outlined in Figure 3.

**Figure 3: Mobilizing Knowledge**

<table>
<thead>
<tr>
<th>Complexity of Market knowledge</th>
<th>Complexity of Technological knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

- **Move information about the technology to where the market knowledge is**
- **Move knowledge by rotating people and by temporary co-location**
- **Exchange information**
  - (Arms-length, digital transfer sufficient)
- **Move information about the market to where the technology is.**

The starting point is to rate both the market and technological knowledge your innovation project needs to draw upon on the scale of complexity: from knowledge that can be readily codified and reliably interpreted by those working in the context of a different location, right through to knowledge that is tacit and difficult to properly interpret once taken out of context.

If both the required technology and the market understanding score low on the scale of complexity, the knowledge can mobilised for innovation using IT and digital communications tools; the innovation team can interact with the various locations supplying knowledge at “arms-length” (the lower-left quadrant of Figure 3).
When the success of the innovation project is likely to depend on utilising market knowledge that is high on the scale of complexity (such as a subtle understanding of customer behaviour), but technical knowledge required is readily codified, then it makes sense to locate your innovation team near the key market knowledge (where they can experience the local context first hand). The technological knowledge, being much more readily mobile, can then be piped in (the upper-left quadrant of Figure 3).

By contrast, when the technological knowledge required to innovate is more “black art” than science and procedure or requires spontaneous and close interaction with suppliers, universities or other local partners, but the necessary market knowledge can be fairly well represented through data and research reports, then the innovation team should spend most of its time working in the clusters from which the technology originates (the lower right quadrant of Figure 3).

Finally when both the market and technological knowledge required to innovate score high on the complexity scale, pockets of knowledge dispersed around the world will need to be mobilized by moving people (the upper right quadrant of Figure 3). This was the situation that ST faced in designing its innovative “system-on-a-chip” to control Seagate’s hard disk drives (HDDs). The technological knowledge was in the heads of engineers scattered between multiple locations, while the “market knowledge” (in this case knowledge about the performance requirements of each specific component and activity within a HDD necessary to create a fast and reliable final product) was part of the black art mastered by engineers in different Seagate sites. Mobilizing this set of knowledge involved forming a virtual innovation team with members working face-to-face for short periods to exchange knowledge that was otherwise difficult to move, before returning to various places dotted around the world where they could draw on specific types of local knowledge to push the project forward. ST recognized that simply bringing the innovation team together to work in one location would not have been effective, as divorced from the local context of the know-how they were meant to contribute, member of the team would have been proverbial “fish out of water”.

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Clearly managing an innovation project that requires complex knowledge to be mobilized is far from easy. But as we gain more experience with managing new organizational forms – such as virtual teams – the scope for globalizing innovation will continue to increase.

**Globalizing Innovation**

The benefits gained by globalizing supply chains -- lower costs and access to new inputs unavailable at home -- have been immense. Globalization of the innovation process, meanwhile, has lagged behind. Yet competitive advantages gained by those companies that have taken steps toward globalizing their innovation activities have been every bit as impressive. By harnessing the diversity of potentially relevant knowledge scattered around the world, these metanational innovators have been able to create more, higher-value innovation at lower cost.

Globalizing innovation isn’t easy: it requires commitment to build an innovation process capable of effectively prospecting the world for new sources of technology and novel market insight, establishing the right knowledge footprint the feed innovation in your company, and careful attention to mechanisms and organizational forms through which dispersed knowledge can be mobilized and integrated.

For many companies, globalizing innovation also calls for a change in mindset. Most multinationals succeeded overseas by “thinking global, acting local” – adapting products and services perfected at home to the differing needs of local markets around the world. But globalizing innovation requires the opposite mindset: “thinking local, acting global” because to be effective metanational innovators, managers throughout the world need to continually ask themselves “what distinctive knowledge do I see in this local cluster?” and “how can it contribute to our global innovation effort?” Globalizing innovation will require a different type of innovation process, organization and management. But we
believe the potential size of the prize means you should be asking yourself how to equip your company for just this task.

7216 words

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iii Oxford English Dictionary.