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Think Smart, Think Connected
White Paper

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THINK SMART, THINK CONNECTED

Maintaining Competitive Advantage in an Open, Connected Landscape.

The Findings of an Executive Summit on EU Adoption of Internet-enabled Device Networking / M2M.

August, 2003

A Harbor White Paper
in conjunction with
Spinnaker Venture Partners, LLC

HR Harbor Research, Inc.
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1

To better understand the real-world impact of Internet-enabled device networking / M2M on the global enterprise, as well as the current state of adoption behavior in the EU, Spinnaker Venture Partners and Harbor Research facilitated an executive summit meeting on 11 July 2003 in Paris, France, to discuss these issues with leaders of major global companies.

Executive Summary

▸ Increasing connectedness of owned and non-owned assets, and technology openness, are opening massive new opportunities in global business but also driving the need for new strategies and corporate cultures.

▸ All participants agreed that the future of their businesses will be shaped by connected devices. The opportunity lies essentially in a new realm of services based upon ubiquitous device information.

▸ Data security and privacy remain large concerns, but all participants felt confident that the push towards openness will move forward in spite of these challenges and that these hurdles will not hinder (or hold back) market acceptance. Rather, technical, process, and cultural solutions will emerge to address these challenges.

▸ The era of "going it alone" or "flying solo" is over. The "command-and-control" strategies of the past will not work in the complex, instantaneous, interwoven world of a global digital economy. The creative use of formal partnerships as well as strategic alliances will result in a re-organization of the existing alliance networks. New kinds of alliances and partnerships will be formed, leading to dramatically different alliance networks than we see today.

▸ The way that companies choose their technology and business alliances will be crucial to success.

▶ Increasing connectedness and openness means great opportunity but also great risk. Risks include the possibility of commoditization, the possible dilution of identity and leverage, and the possible loss of customer account control.

▶ It is vital to find ways to share risks and rewards as companies move toward greater asset-connectedness and openness. Some ways to share risk include joint ventures, joint-investing, and leveraging of infrastructure.

Background

Everyone agrees that the world is rapidly moving toward a global, services-based economy. But one rarely hears much detail about how this will come about, and how it will actually work. A global, services-based economy represents a paradigm-shift that arises out of an equally important shift in underlying technologies—the shift from purely human-centric electronic communication to global device-centric communication. The new realm of profitable services required by the new global economy will depend upon the availability of ubiquitous digital information from these newly connected devices.

In an effort to better understand the real-world impact of these developments on the global enterprise, and the current state of adoption behavior in the EU, Spinnaker Venture Partners and Harbor Research facilitated an executive summit meeting on 11 July 2003 in Paris, France, to discuss these issues with leaders of major global companies.

The summit was attended by top-level representatives from Air Liquide, France Telecom, IBM, MGE UPS Systems, and Schneider Electric.

To design the meeeting, a modified Delphi research method was employed to survey a leading group of industry experts, including respondents not present at the meeting itself. Thus, the materials reviewed and discussed in the summit, and summarized here, represent the views of a broader group of participants, including ABB, Bayer, Invensys, Nokia, Schindler, Siemens, and Vodafone.
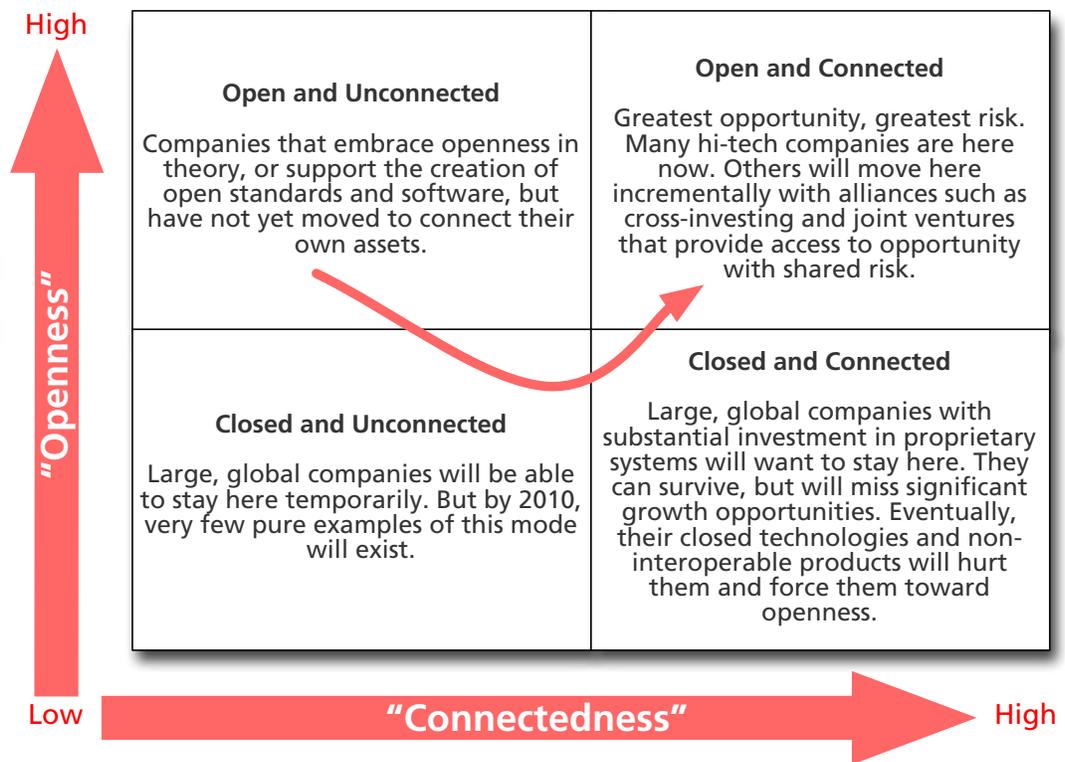
3

Connectedness and Openness Will Continue to Expand

The developments we see in global business have their origins in two basic phenomena:

▸ **Increasing connectedness** of physical and informational assets, both within the individual enterprise and across their customer base and supply chain.

▸ **Increasing openness** of technologies and standards, which makes possible increasing connectivity itself, as well as increasing information-sharing, collaboration, and interoperability of systems and physical products in the field.

Figure 1: The Movement Toward Openness and Connectedness

Open and Unconnected

Companies that embrace openness in theory, or support the creation of open standards and software, but have not yet moved to connect their own assets.

Open and Connected

Greatest opportunity, greatest risk. Many hi-tech companies are here now. Others will move here incrementally with alliances such as cross-investing and joint ventures that provide access to opportunity with shared risk.

Closed and Unconnected

Large, global companies will be able to stay here temporarily. But by 2010, very few pure examples of this mode will exist.

Closed and Connected

Large, global companies with substantial investment in proprietary systems will want to stay here. They can survive, but will miss significant growth opportunities. Eventually, their closed technologies and non-interoperable products will hurt them and force them toward openness.

"Openness" — High / Low
"Connectedness" — Low / High

Source: Spinnaker Venture Partners, LLC and Harbor Research, Inc.

All companies that we surveyed and met with at the summit agreed that the future of their businesses will be shaped by new, significant revenue opportunities

emerging from the availability of the information provided by these newly connected devices. This world of smart, connected devices has been an important enabling platform, as business strives to serve customer driven needs with a service / solution business model.

The general concept of "connectedness" is less challenging than the concept of "openness." The companies represented at the summit meeting are global entities that have already attained a high degree of connectedness with their customer base.

Much of that connectedness, however, has been accomplished to date with closed, proprietary systems. This is partly because dependable open standards and technologies have only recently become available. But more significantly, "openness" represents uncharted and risky terrain for most companies.

The summit participants agreed that an increasing adopton of "open" standards and systems for global connectedness presents significant business risk while providing access to the new growth and services opportunities driven by M2M. Thus, much of the summit discussion centered on the question of how to minimize risk while moving away from proprietary, closed solutions, and while making more and more enterprise information available for cross-enterprise sharing.

The drive to adopt more ubiquitous networking and communications technologies presents enormous challenges to the companies that have, early on, established extended service-based businesses to maintain control over their customer base and drive annuity-like revenue lines.

Air Liquide, which acted as host for the summit, is a global leader in industrial gases, with customers in over 70 countries. The company has been an aggressive early adopter of networked field devices and remote monitoring, and looks forward to evolving its existing initiatives.

"A key strategy for Air Liquide is to expand our revenues by building on our core capability to automatically manage remote production facilities," said Jerome Girard, CEO of the Air Liquide Venture Services Division. He continued, "We are capitalizing on the trends in M2M to build new services offerings for our existing

customers in markets such as healthcare and semiconductors, as well as to move
Air Liquide into new markets such as remote hydro-plant management."

5

Privacy and Security Will Become Most Significant Concerns

The security of enterprise data and the privacy of customer information were
among the first concerns voiced by the summit participants. They were also the
least controversial concerns—partly because everyone agreed on their importance,
and partly because they are essentially technical problems that will eventually have
clearly documented technical solutions.

Technology developers are well aware of the need for data security. Open systems
like the Linux OS, and open communication protocols like the new ZigBee™
wireless connectivity standard, have been designed from the ground up to include
multiple layers of data integrity and security. Real-world implementations will
always reveal unexpected vulnerabilities, but thanks to global connectedness and
collaboration, fixes will be fast and widely available.

The summit participants agreed that they could not move toward greater openness
without solid demonstration of robust data integrity and security. But they also
had little doubt that the active community of technology innovators and M2M-
oriented startups, largely based in the U.S., would meet these challenges in the
near future.

"We see as one of our greatest challenges the selection of the right constituents
from this community for partnerships," said Laurent Ferenczi, CTO at Air
Liquide. "We need to clearly understand how to better apply capital in a shared-
risk model that helps us achieve our objectives," he concluded.

Business Culture Becomes Big Hurdle

Not surprisingly, the summit participants' business concerns were more complex
than their purely technological worries. In the existing culture of most enterprises,
competitive advantage is usually perceived—to one degree or another—to lie
in ownership, secrecy, and sometimes adversarial relationships with suppliers. It
goes without saying that such a culture does not blend well with the notion of
"openness."

One participant from the technology supplier community summed it up this way: "Over the last several decades, the role of digital information technology in business has evolved from being first a luxury, then a mainstay, and finally what it is today—nothing less than the DNA of the evolution of business itself. We are presently undergoing an historic paradigm-shift from human-centric to device-centric use of global networking. The 'infosphere' of digital data generated by connected devices will soon become the very air that business breathes. Enterprises that do not find ways to live in this global information-atmosphere, and to share it with partners and alliances, will simply not survive."

6

Figure 2: Greatest Corporate Concerns Today and for the Future
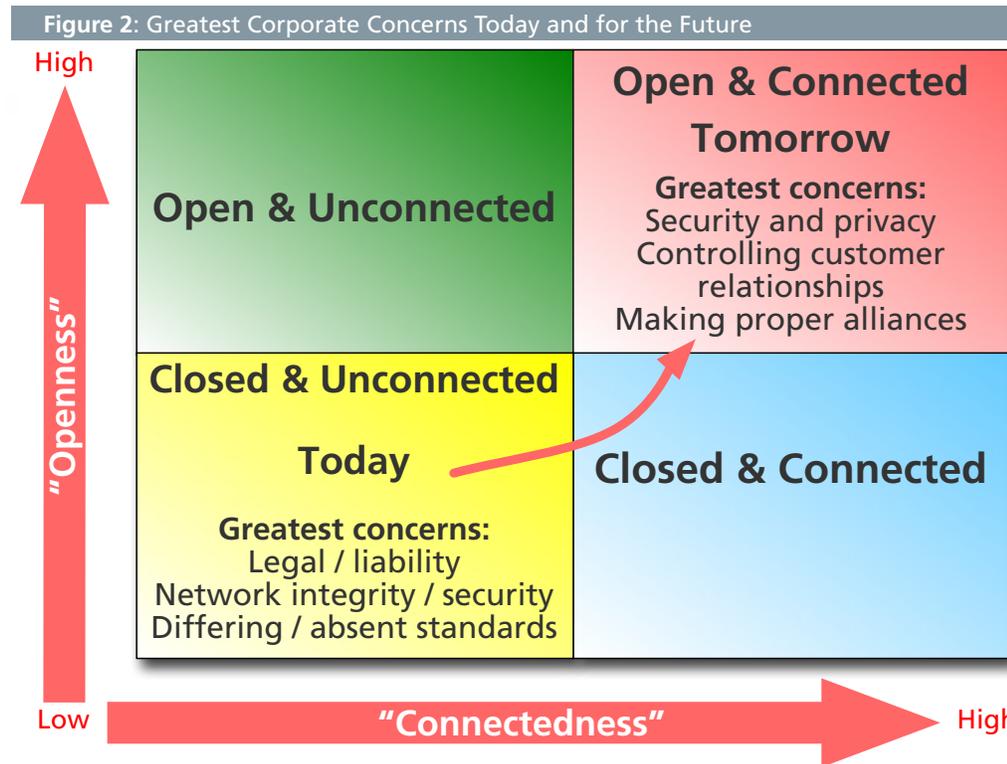
Source: Spinnaker Venture Partners, LLC and Harbor Research, Inc.

But how do businesses become more open and connected, change their underlying concepts of "ownership," and yet remain distinct and profitable entities?

7

New Rules For Competing and Collaborating Underscore the Lessons of Open Source

Interviews with industry thought leaders conducted prior to the meeting suggest that an answer lies in the evolution of Open Source software. Less than a decade ago, Open Source was widely viewed as the province of hacker kooks who were somehow "against profit" and wanted to "give everything away." That was, of course, a gross misunderstanding. Early Open Source advocates simply understood that core digital technologies would quickly become as fundamental to life and business as electricity itself, and that monopoly-enforced standards would be as bad as the market-fragmentation that results from no standards.

Today, Open Source has transformed the policies of the largest software companies in the world, and will continue to do so because it represents a fundamental evolutionary force.

The Open Source concept caught on and evolved so rapidly partly because it had a great "demo": the Internet itself. Every time you send email or visit a Web site, you are using open technology developed and maintained by a global collaboration of software designers and network engineers. Even though it was originally private and closed, developed with military funding, the Internet is now a decentralized and open network.

The Internet and successive Open Source developments—e.g., the Linux OS, the middleware engine PHP, the MySQL database manager—have demonstrated that ownership of core enabling technologies is not a requirement for maintaining competitive advantage.

In fact, seen in the proper light, forgoing ownership at the core level is a great liberation. Why? Because it's hard to maintain a profitable business trying to sell people core technologies. Those technologies—the network itself, access to the network, operating systems, code languages, database managers, and so on—quickly become part of the taken-for-granted fabric of reality, i.e., commodities with steadily declining profit.

The Era of "Flying Solo" Is Over

Interviewees and meeting attendees all agreed customer and technological changes have brought an end to command-and-control strategies among high-tech companies. The days when a company could generate value simply by building a better device (with a few partnerships) have given way to an age of interconnectedness in which value is built as much by collaborating with the right peers as by providing great products and services. Companies in the software business were among the first to build complex webs of influence across industries and computing platforms.

Today, the expansion of the Internet uniquely positions companies in the information management and communications technology arenas to build webs of power and influence. And although many companies have employed webs as a partial supplement to their strategies, the greatest opportunities can be realized by forging true collaboration among peers.

Participants pointed out that several market conditions have eroded the strength of the "fly-solo" strategy. The group felt three forces were at work: first, the pace of change in high technology, particularly with the advent of M2M, is too great for any single company to provide end-to-end solutions. Monolithic, proprietary technology platforms have given way to semi-open technologies.

Second, customers seek to avoid binding relationships with suppliers, which increase switching costs and place buyers at the mercy of vendors' judgment about technology, feature sets, and so on. Paradoxically, these customers of high-end business systems—computer networks, telecommunications infrastructure, MIS systems, manufacturing and ERP systems, etc.—seek increasingly vertical solutions tailored to their particular business requirements. As a result, customers are looking for semi-open products from a group of solution providers.

Third, good management requires companies to focus on doing one thing well—product innovation, low-cost manufacturing, or developing knowledge of customers, for example—while customers reward companies that excel (or appear to excel) at all aspects of their businesses. In short, companies can't focus on innovation and operations and marketing in a meaningful way without getting distracted and serving too many masters. Customers and investors, however,

reward companies that deliver great prices, high-quality products, technical innovation, and vertical knowledge.

9

A True "Information Age" for Business

The group vigorously debated the evolving nature of business and profit models driven by M2M. Everyone agreed that after the shift from closed and proprietary to open and connected, competitive advantage and profitability will lie in creative use of shared, non-owned commodities and the real-time customer contact and services they make possible. Differentiation, value addition, and brand-identity will now occur at a higher level, not at the core. Obviously, companies will continue to prosper in open, connected landscapes, but they will do so in different ways—some of them variations on old models, some entirely new.

Rather than owning declining-profit commodities, companies will own their particular innovations, whether in technology or services, and they will also own the stream of device-data coming in from their connected devices in the field. Most importantly, thanks to that device-data, companies will "own" their relationships to customers in ways never before imagined. What happens after that point depends upon the strategy adopted. A company could, for example, "lease" part of its stream of customer-information—and thus part of the customer relationship—to another company wishing to provide value that is not part of the first company's business. Other relationship owners could lease relevant parts of their own customer information back, or share information in a joint venture or some other contractual arrangement.

The Risks of Openness and Connectedness

As revolutionary and far-reaching as the device-networking paradigm-shift is, the off-line interviews and debate within the meeting suggested that this does not change everything, and that the eternal truths remain eternal. When you open yourself to relationships, and connect to other people, you can get hurt. And the greatest opportunities usually involve the greatest risk.

Comments at the meeting emphasized the real-world risks of open technology and asset connectedness, including:

▸ Possible commoditization of your own products and services.

▸ Possible dilution of your identity and brand-recognition.

▸ Possible loss of control over your customer relationships.

"Most companies looking to connect their tangible and intangible assets still view themselves largely as 'product-centric' businesses," said Harris Kagan, technology development executive from Invensys. He continued, "This puts many organizations in a very precarious position, with one foot in the new world and one in the old world. Making the move from product-centric to services-centric will not happen automatically, even with rich streams of device-generated data. It's a major transition that will demand different strategy and culture than most product businesses have known before."

Creative Alliances Are Essential

Creating "business webs" of partnerships and strategic alliances has always been a good idea. After the shift to openness and connected assets, such alliances become a matter of life and death.

As always, companies will seek protection from risk in careful contractual agreements with partners and alliances. Companies will pursue alliances that involve shared risk, shared incentive, and mutual benefit. And, as always, they will seek protection from risk in careful contractual agreements.

The tendency will be toward dispersion and decentralization. Thus, we expect to see a flurry of cross-investment and cross-licensing agreements in the near future as companies begin to explore the new terrain.

For those interested in more formal commitments, joint ventures are another obvious way to share risk while moving forward. Our summit meeting was attended by executives from two companies that have already done this. France Telecom's EQUANT division recently partnered with Schneider Electric in a joint venture to deliver Senside Remote Monitoring and Diagnostic Service to Schneider's customers.

11

France Telecom believes that its role will be to deliver the virtual backbone for new device-based services on a global scale. Phillipe Eon, Director of Marketing and Development at France Telecom remarked, "Our customers are telling us that we need to take a position at the center of this trend to provide the global infrastructure that allows these devices to communicate in a seamless and ubiquitous manner."

The business leaders attending the summit meeting, as well as those surveyed or interviewed separately, all strongly agreed that the services opportunities arising out of Internet-enabled device networking and M2M would be a key component of their future revenues, and must be addressed with a global strategy. ◄

About Spinnaker Venture Partners, LLC

Spinnaker Venture Partners, LLC — http://www.spinnakervp.com/ — located in Boston, is the leading venture development firm that provides equity and management expertise with an exclusive focus on building leaders in the emerging "pervasive computing" markets. Spinnaker is unique in its deep domain expertise and tight investment focus, and is well-positioned to successfully impact its portfolio companies. Spinnaker's partners are experienced entrepreneurs who bring together powerful backgrounds in business, finance, and technology to identify opportunities for synergistic investments in targeted, emergent, vertical markets. Spinnaker is focused on research-based investing in early and growth-stage performing companies.

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12

About Harbor Research, Inc.

Harbor Research, Inc. — http://harborresearch.com/ — is the only research and consulting organization to focus exclusively on the impact of the Pervasive Internet on global business. Founded in 1983 to examine emergent and disruptive opportunities in high technology, and with offices in Boston and San Francisco, the firm has built deep and extended relationships with larger multi-line companies including AT&T, ABB, General Electric, Danaher, Eaton, Emerson, Hewlett Packard, Honeywell, Hughes, IBM, Intel, Invensys, Lucent, Motorola, Rockwell, Siemens, Texas Instruments, as well as focused growth companies such as EMC, Cadence Design, PRI Automation, Conexant, Qualcomm, SAP and PTC. Harbor also works with a broad array of emergent start-ups and pre-IPO technology ventures, and publishes the innovative online research tool, *Pervasive Internet Report* — http://harborresearch.com/pir/.

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