



The COOK Report on Internet Protocol

Technology, Economics, and Policy



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Official US Economic & Telecom Policy Remains Trapped in 20th Century Views of Top Down Control While Internet and Rest of World Evolve a New Paradigm of Loosely Coupled and Horizontally Based Cooperation We Look to Educate on Importance of Survival of Intelligent Edges

A Review of Supernova and The Only Sustainable Edge by John Seely Brown & John Hagel

A visit to Kevin Werbach's Supernova Conference June 21-22 at the Palace Hotel in San Francisco was a real eye opener. Having been a specialist in Internet and telecom infrastructure for 14 years, it has been too easy to miss a lot of the changes. Principal among them are the specialization along horizontal frameworks of formerly vertical tasks - an ISP, for example, did many things in the early 1990s. As the net evolved, competition (while it lasted) meant that many people found new businesses in becoming specialists in providing email, or authentication or name service or web hosting or billing, or many other activities that make up the ISP's activities. The ISP became a vertical integrator or orchestrator of these horizontal tasks.

Meanwhile, the network itself and the tools it developed including data mining and social organizing software made it possible to run organizations on the basis of loose couplings or horizontally oriented specialties. One example is web hosting. Two years ago I was being offered 200 megabytes of disk space, and 2 gigabytes of bandwidth for \$59 a month. Today I have one gigabyte of space and

20 gigabytes of bandwidth for \$7.95 a month! Not to mention better service from Hostito, a hosting specialist, rather than from a vertically integrated company that attempts to do it all.

It seems that over the past 3 or 4 years the major changes globally have been in the direction of this increased horizontal specialization where highly efficient and capable specialized ecosystems have been proliferating taking advantage of the emergence of broadband and of tools for remote real time collaboration to grow and prosper.

Of course there is always the trailing edge. At Supernova it was also represented. Wonderfully well by Hossein Eslambolchi, CTO of ATT giving a talk about his soon-to-disappear company's oh-so-2001 global IP network. Then there was IBM - a good company - one that is far smarter than almost every other corporation anywhere near its size. But in the new interconnected world of fast nimble quick there was Kris Lichter talking about IBM's working with a dozen organizations in its VC operation 4 years ago and at least five-dozen now.

"Is bigger and bigger still, better?" said the little voice at the back of my mind. And the next day there was Alan Ganek VP of Autonomic Computing for IBM giving a talk similar to the one I heard in the spring of 2002 and handing out the same paperback book that he did then -

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one printed in 2001! The presentations were good but they were trailing edge. Four years have gone by. A lot has happened. Perhaps Kevin included them as a bookend to the rest of the show that was all leading edge.

By way of example - just when I think I have gained an understanding of how the world is working along comes new research to show me that while I have been catching up, the world has changed yet again. Landing atop a flood of recent studies showing the emergence of China and India as likely 21st century super powers is a new book *The Only Sustainable Edge: Why Business Strategy Depends on Productive Friction and Dynamic Specialization*. The author's are John Hagel, formerly of McKinsey and John Seely Brown, former Director of Xerox PARC. The book has its own very nice web site at <http://www.edge-perspectives.com> and John Hagel has a worthwhile blog at

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http://edgeperspectives.typepad.com/edge_perspectives/

Although its subtitle is clumsy, as it attempts to distill the message of the entire book into just the title, this book goes well beyond the message of other basic texts like Thomas Friedman's *The World is Flat*. The rise of Asia it turns out is not just wage and price arbitrage engendered by off shoring as cost cutting enabled by masses of exploited Asian workers. It is something more profound - a search for talent that enabled by the economic trade and regulatory trends of the last 20 years is increasingly found in Asia. Young people as bright and in many cases better educated and very hungry are thriving in societies that value the basic rudimentary work the US did at the end of World War II.

The authors note that with the increased speed of technology and business change, basic business strategy is changing in unanticipated ways. The value creation that provides the foundation of business longevity is shorter lived. They note that the average amount of time that a company spends on the Standard and Poor 500 List has decrease by 80% from 75 years in the late 1930s to 15 years in 2000. "Companies' departures tend to be sudden and severe, by acquisition or by irreversible financial distress."

The author's research has lead them to focus on the edges of organizations as being the only locations where an organization can be fluid enough to keep up with large scale change and capability creation. Indeed as a key insight of the Internet has long been that its intelligence and value is founded in its edge, the authors instruct their executive audience that they must monitor the periphery of the businesses.

It's the Edge Stupid!

The authors state: "At these edges lie our richest opportunities for value creation and our strongest protection against value destruction. So what do we mean by edge? First we mean the edge of the enterprise where on company interfaces or interacts with another economic entity

and where it currently generates marginal revenues rather than the core of its profits. Second the edge refers to the boundaries of mature markets as well as industries where they may collide, overlap or converge. Third, we touch on geographic edges, especially those of such emerging economies as China and India where consumers of all kinds crave western goods and services that will ease their burdens and improve their lives. Finally we refer to the edges between generations where younger consumers and employees - shaped by pervasive information technology are learning consuming and collaborating with each other and where baby boomers are preparing to retire and switch careers over the next decade. In this book we argue that these edges will become the primary course for business innovation and therefore fertile ground for value creation." A page later the authors conclude: "... we will begin to see something remarkable that the edge will reshape and eventually transform the core."

In the older larger organizations the core is huge. Witness my remarks about ATT and IBM at Supernova. Consider Tom Evslins' remarks about ATT in last month's issue. ATT had some many vertical layers inside it that Vice Presidents seemed to exist to deal mainly with other vice president and the organization of that company was such that contact with its customers was much more superficial than it should have been. ATT, in worshipping its core, lost the battles at the edge where change is determined. As a result, it will itself now disappear.

The lessons of Supernova and of *The Only Sustainable Edge* are that the essence of value creation is found in the loosely connected ecosystems making up both the Internet and other organizations. Moreover, that there are no equilibrium states in the Internet. Just increasing levels of specialization.

The lessons of *The Only Sustainable Edge* are that IT, networks and especially their broadband instantiations are now sophisticated enough to enable loosely coupled phases of specialization through out all business.

That capability building through better talent networks is the task of business execs. That the leading edge is building new capability not just by off-shoring for price arbitrage but rather for talent networks that cannot be found at home.

That top down plan implementation is increasingly impossible in the face of bottom up Asian design ecologies that have outsourced all most all stages of many of their complicated design, development and manufacturing processes to other groups of second and third tier suppliers that in turn are breaking down and refining these manufacturing processes still further. With more edge control and less by the center, if anyone sees a reason to apply innovation and change, it can be quickly done. In this new world there is no single right way to do things - everything is refinable all the time.

In the view of Hagel and Seely Brown: the division of the world into loosely coupled ecosystems using process networks to link and do business is what is new. Something especially dependent on good IT and telecom. The fact that you have Li and Fung kinds of companies that exist to be the middlemen guides through the acquisition along the edges of what was developed better at the center is what was new. Attempts at being self sufficient - that is independent of the process networks are likely to be attempts at failure. They hold out capability building as the answer. Rigidity in centrally controlled rules holds back capability building. The way forward is fast and loose.

Processes are getting more specialized and more flattened. Roles are there for coordinators and process ochestrators. The model for telecom is in thousands of horizontal specializations not in a dozen vertical silos.

The Hagel Brown message for telecom abroad is bright. At home it is rather more gloomy. Why? Because at home we are captive to the dinosaurs. So far they have won. Above all every employee of every ILEC should be reading *The Only Sustainable Edge*. The interview with Macy Hallock sheds light on the daunting task facing community networks. But the Medina County chapter

that is published herein is only the first step. *The Only Sustainable Edge* helps to point them to even more reasons why community owned infrastructure and open access LoopCos are the only way forward. They need it for all the reasons Macy and his team have enumerated. But they need it as well to sew the ground for local process networks.

Unfortunately those with their hands on the levers of political power and now the courts in Brand X see it differently. In the US it may get much worse before it gets better.

So much for the framework of the book. It was the substance as expressed by John Seely Brown in the Wednesday morning lead off that I found so exciting that I walked out in late morning to buy a copy of the book in order to be able to read it on the plane on the way home -- a task that I accomplished.

John Seely Brown's Supernova Presentation

Editor: I missed the first minute or two of John Seely Brown's outstanding talk where he was comparing Toyota to Detroit and pointing out that in the Toyota culture it is an honor for a middle manager to be sent for a tour of duty on the assembly line while the same action in Detroit would be seen as a demotion. Toyota, he pointed out, taps the creativity of the thousands of suppliers and their employees thru productive friction. He was saying that they aim for lowest cost -- something that is not necessarily the lowest price. Management features deep dialogue and collaboration. They say: bring us new ideas and innovation. We offer respect. They treat exception conditions as action points. When a defect is found, the person who finds it is to stop the entire line - freezing the context until the source of the problem can be discovered.

The next paragraph starts my recording which I have attempted to render as faithfully as possible.

John Seely Brown: Detroit has ideas

ideas about their part supplier networks that are the opposite of those held by their counterparts in Asia. In Detroit every supplier must supply parts that conform to exact specs. If any supplier has an idea about how to improve something, there is no way that he is going to tell one of the three major auto builders of Detroit what it is because they will take the idea and go off and search for the lowest price to realize it. The Detroit builders are sitting behind purchasing agents who say: listen you must have already spent some money on this, so I am going to take your idea and shop it around to our suppliers in an effort to see if they can make it even cheaper than you.

What you have then is a top down design scheme in Detroit and in Toyota you have a very different scheme leading upward with productive friction at all the action points you can imagine. In Toyota or generally elsewhere in Asia expropriating the design idea, as in the Detroit example I just gave, would not be tolerated.

A second example is the motorcycle industry in China. There is another ecosystem developing here is a city called Chongqing where they are rebuilding an industry from the bottom up. This ecosystem came into existence in 1997. Motorcycles here were being produced by state owned enterprises in the classical way of total top down design. What happened was that one of the major assemblers who was working in one of these state owned enterprises decided, on his own, to bust out of that system.

He said I see what you are trying to get built here. It is a system that has four major parts to it: a frame, an engine, a suspension system and faring. If we can just decide on what each of those can look like, I will organize a vast web of sub suppliers - second and third tier suppliers -- that will be coordinated around this basic focal point object. Why? Because basically, we are doing a campaign. We are not copying the war room but we are taking an existing vehicle and saying this is the artifact that we want to find a much better and cheaper way to build.

What happens here is that you have as

a result, a very interesting swarm innovation cycle. Starting in teahouses in Chongqing, suppliers and sub-suppliers began negotiating. The process was similar to what happened with Toyota but now much more informal, saying if I do something this way, can you compensate in your design in that way? You get these swarms of negotiations happening. And out of the swarms comes a brand new motorcycle. Why is this interesting?

Honda, a non participant, likewise builds motorcycles in Chongqing. The trouble is that this swarm innovation technique in terms of building up a whole new process of bottom up innovation where everyone knew what was happening gave Honda's competitors an ability to build motorcycles that has devastated Honda. Since 1997 Honda's market share in Viet Nam for example has gone from 90% to 30%. This ecosystem now produces over 50% of all the motorcycles in the world. No one can come close to competing with the cost structure of this.

Notice that this is very similar to how open source works because most open source items have a reference implementation that coordinates a swarm of innovation surrounding it,

A third example is the ODMs in Taiwan. ODM stands for Original Design Manufacturer. You may not realize it but almost every product you have today comes from an ODM. An ODM gets contacted by Dell in computers or by Hewlett Packard, or by Kodak in cameras to say I want a camera of this kind. Here are the kinds of properties that I want. Does Kodak or HP design the detail of that camera? No way. They turn it over to the ODM in Taiwan and that ODM enlists its own vast network of suppliers that starts figuring out how to build such a camera at such a price point.

I just came back from walking through the factory of one of the biggest ODMs in Taiwan and I was very surprised to see that they were producing the very highest end flat panel TVs for SONY. Even SONY has to use these folks. I met with someone who had just designed a brand new receiver and imagine processing

chip inside that TV. You have in these networks massive amounts of innovation talking place on the fly. Basically it is a very major distributed network in Taiwan that does the design and then the manufacture of the design.

My last example has to do with what we wear. This comes from Li & Fung. Li & Fung is a 100 plus year old trading organization originally founded in Hong Kong. We all know that the clothing industry has a 2% margin but Victor Fung turns out to have on the average a 50% return-on-equity. It has dropped down to 30% several times, but most of the time it runs at 50%. He has a 5 billion dollar annual revenue stream and is getting one million dollars stick through revenue per customer.

What is going on in terms of his ability to be a major orchestrator? In terms of picking up deep specializations and in terms of hundreds of different companies and ecosystems around the world but mostly in Asia, he can put together a garment at a price point that is almost unmatched. The example here is that, after he has negotiated something with Ann Taylor, whose representative would tell him "here's what I want," Victor would say, "no I am not sure you really do want that because I know basically that there is a new kind of yarn that is going to become available over here in HaNing. If you let me use my yarn, I can weave it this way. I can dye it that way and cut it this other way. You will get something that is basically indistinguishable from what you want and will be able to deliver it to you at a fraction of the cost you expected."

A Constant Application of Learning

Once he understands the basic idea of what Ann Taylor wants, he can take his understanding of the expertise of dozens of basic eco-systems around the world and find exactly what is needed. If the yarn is produced here, he knows exactly where else it can be most advantageously woven, cut and dyed. He is able to use the distinctive expertise in terms of one particular firm in each one of these eco-

systems that he taps.

If there were all there were to it, it would not be all that interesting. What is really interesting is that he views this leveraged ecosystem as a major learning architecture. Not only does he apply quality and performance metrics to all the transactions he studies, he also looks at how to do bench marking within an ecosystem so that several of the factories within an ecosystem of his can follow how each other is doing. What is interesting to me is that he looks at how and why a given supplier has found a value chain in a given eco system. By these actions, he enables himself to orchestrate a lot of cross-fertilization. *You might think that he just orchestrates a supply chain, but no, he in fact is actually orchestrating learning left, right, and sideways.*

He knows all sorts of interesting ways to manage these organizations. For example, he would never ever take more than about 60% of his goods from a single supplier. Why? Because he wants to see what his competitors are doing. He wants to see what happens when this particular supplier can't deliver. He usually finds out that something else is going on that he otherwise would have missed.

[Editor: See Figure One: the Li & Fung Slides from the Supernova presentation on the next page.]

I want to also suggest that ***this whole off-shoring thing has a lot more behind it than just wage arbitration. In fact it has to do with accessing distinctive skills.*** Let me give you a couple of examples with strategic ramifications. For example if you want to do extrusion plastic there is no better place in the world than to do it in this ecosystem just north of Hong Kong. If you want to build complex systems on a chip for certain kinds of software, there is no better place in the world to do it than an ecosystem about 100 miles south of Beijing.

So when you see these educational feedback mechanisms inside these ecosystems that are accelerating distinctive skill formations in various ecosystems, you see that continued learning is critical. In fact

I want to show one tiny example of a call center called eTelecare that comes out of the Philippines and turns out to be one of the best call centers in the world. This group started on one of the lowest rungs of the call chain ladder you can imagine dealing with customer service on stored value cards,. After that they moved up the chain to customer service on Travelers Checks and then finally moved to customer service on mutual fund product lines. They did this whole skill escalation in 18 months.

If you go inside a US call center you will find a ratio of 50 agents for every manager. In many of the Asian call centers I have been in it is four to one and at eTelecare it happens to be 8 to one. Why? Because the way these call centers are being run is with the belief that the purpose of middle management is to accelerate the rate of learning on the part of front line employees.

In fact one of the most successful companies is InfoSys out of Bangalore. They are very focused on organizational learning - something that is almost beside the point. One Saturday morning John Haggel and I were interviewing one of their managers and we asked: Can you tell me how much time you spend with your management team on reflecting on what has happened during the past week? Without batting an eyelash he said 25%. They understand learning as situations where the exceptions are the most powerful teachers.

I want to suggest that, if you look at how these distributed networks are enabled ,you will see that they depend on an interesting confluence of new IT architectures and tools that have come together to enable this transformation. One part depends on the existence of service oriented architectures (SOA) that form the very basis of being able to deal with loose coupling so that I know that I may use this supplier for that kind of job because this supplier has the most distinctive skill applicable to the task at hand and can couple into that system very readily.

But secondly, if I am going to use service-

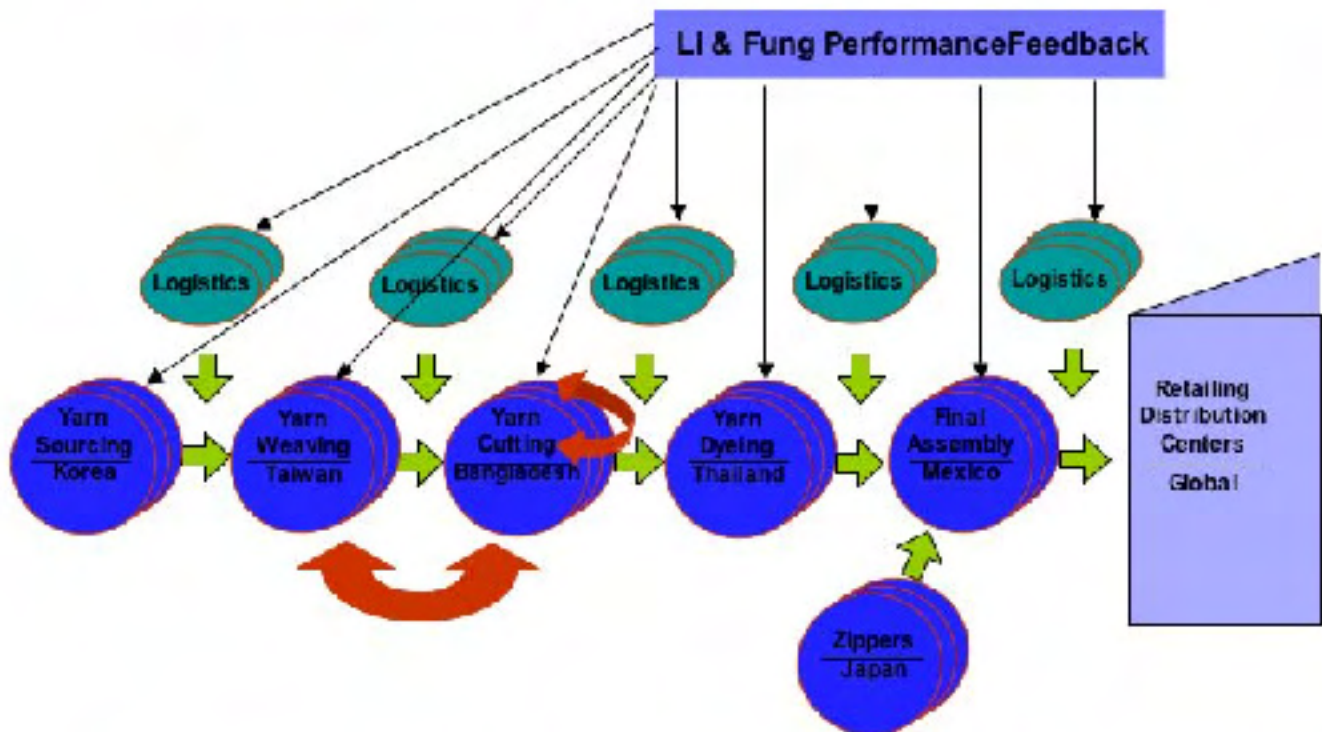
Li & Fung's Process Networks



5 billion rev-2002
1 million/employee
30-50% ROE
7500 suppliers
37 countries
Li & Fung Limited



Li & Fung - supply chain orchestration (around long term relationships)



Learning, bootstrapping skills and knowledge creation

Figure one: The Li and Fung slides from JSB's Supernova Presentation

oriented architectures, I have to have an awful lot of computer power so I have to think about how I scale out this architecture. And we now have new types of virtualization architectures that enable us to weave clusters of machines together into grids and scale out the SOA architecture really bringing it truly alive.

But the most interesting thing that ties into so much of what is talked about at this conference is the new types of interactions. We haven't thought as much as we should about how we take social software tools and wrap them around SOA kinds of architectures. Why? Because basically, as you try to straighten this architecture out, the only thing to expect is the unexpected. But we don't yet know how to build SOA or any other kind of architecture that handles exception conditions.

"I can't ship the whole lot via my air-freight supplier. Who can I get to pick up the slack?" is an example of an exception condition. If this happens enough you will build a rule to handle it. But what would it mean if you could freeze the context of that exception condition? We will call that frozen context an action point and we will call the particular stakeholders together on that issue and ask them to look at the context of the break down in the zone that fixes the breakdown. We see this as a kind of fabric that underlies how to accelerate this type of collaboration across this vast web of suppliers.

But there is a new strategic triad coming. On the one hand when you look at how the ecosystems work and feedback structures within those ecosystems, you begin to see a new form of dynamic specialization where we become over time increasingly better at a particular set of skills. If that is the case, then you want to see how you can string together kinds of complementary specializations down the whole value chain and now you have to look across each ecosystem as well as picking up the very distinctive dynamic skills within each ecosystem. You have learning going across systems and connections going on through time.

If you do those two things right, basically

you have a new way to accelerate capability building. *So our argument is that the only sustainable edge is to be found in figuring out how you can accelerate capability building faster than anyone else.* You can do that not just by focusing on your own inside inventory but by focusing on how you set up partnerships.

The purpose of the successful business now is to accelerate capability building getting better faster by learning from others within and across ecosystems. This is a form of open innovation built around dynamic specialization, productive friction and process networks.

Perhaps the real purpose of the firm nowadays is not to lower conventional costs but rather how do you accelerate through productive friction the ability to learn through adaptive thinking?

Extended Excerpts

Editor's Note: In the spirit of Amazon and the NY Times and first chapters I am offering readers an extended verbatim excerpt from early on in this book. From the prologue:

SHIFTING TO A DIFFERENT WORLD VIEW

(Page 2 "We believe that a new opportunity and a new imperative-the acceleration of capability building-will shift our individual and collective mind-sets from a worldview that focuses on static, zero-sum relationships to one that emphasizes dynamic non-zero-sum relationships. As we adopt these different perspectives, we will find that most of our institutions today are fundamentally lacking."

"Static, zero-sum worldviews generally arise when people focus on the allocation of existing resources. Existing resources have a fixed quantity, and with relatively modest exceptions, if one party acquires a resource, other parties are deprived of that resource. This worldview is a natural orientation of large, well-established players-they become more concerned with defending existing resources because they have a lot to lose on this front, compared with the opportunity to

create even more resources. With its seventy-year focus on equilibrium states, the economics profession has reinforced this orientation. Equilibrium states are easier to model quantitatively, but such models simplify the world, including the key assumptions that capabilities and consumer preferences are a given."

"If we recognize that capabilities are not a given, but can be quickly built, our worldview undergoes a fundamental shift."

[**Editor's Comment:** The remarks about "static, zero sum world views" are wonderfully reminiscent of the debates with the ILECs. I ask what has happened to our society as we seek wealth by collecting rents on outmoded technology rather than use new technology to create new wealth? A sad, too often repeated situation. One of the most interesting aspects of this book however is to see the authors paint the operations and economics of the most forward looking parts of the business world in Internet terms. Back to Brown and Hagel:]

"Now, we become less concerned with the distribution of rents and more focused on the creation of new rents. Relationships that were previously viewed as competitive become more complementary. We begin to realize that we need other specialized players if we wish to deepen our own capabilities more quickly. The new value we can create together moderates, even if it never entirely eliminates, the concerns about the distribution of proceeds. Physical and even intellectual property (at least in the sense of ideas that can be captured in patents or copyrights) becomes less central-although certainly not irrelevant-because this property is fixed in its capabilities. We begin to turn our attention more to the (page 3) people we work with, because they hold the key to the acceleration of creatively building capability-and therefore the creation of new value. By discovering new uses for the physical and intellectual property we own, new capabilities in turn can help make this property even more valuable."

"More generally, stocks of existing assets, including information and knowl-

edge, diminish in value relative to flows of new ideas and experiences that can help accelerate our capability building. This is true for all institutions, not just business enterprises. In many cases, the institutional ability to accelerate Capability building will depend as much on positioning in relevant flows as on the attributes of the institution itself. For this reason, this new worldview emphasizes the Importance of the evolution of local ecosystems, global process networks, and communications and transportation infrastructures rather than focusing on institutions in isolation.”

“Comparative advantage also takes on a more dynamic quality. Traditionally, we viewed comparative advantage as the natural resources and labor costs that were relatively stable over time. As we begin to view comparative advantage in skills and practices, we realize that the advantage is far from fixed-it can shift rapidly as local ecosystems help accelerate capability building. Global patterns of production and trade will become much more dynamic.”

WORKING WITH OTHERS TO GET BETTER FASTER

“The three elements that are required to accelerate capability building -- dynamic specialization, connectivity, and leveraged capability building across institutional boundaries-are relevant not only to business enterprises, but to a broad array of political, social, and educational institutions. In this book we suggest that these elements will force us to reevaluate the very rationale for the firm, In the same way, these elements will force us to reevaluate the rationale for most of our institutions.”

“In the commercial arena, the focus for value creation and value capture is shifting from product and financial markets to talent markets.”

(p.4) “Institutions that can do the most effective job of accelerating the building of capability will create and capture value-the rest will inevitably fall by the wayside. We believe this will become the mandate-and organizing rationale-for all institutions, not just business enterpris-

es.”

“Specialization has been an important engine of capability building and productivity gains from our earliest history. The emergence of agricultural societies almost twelve thousand years ago depended on specialization. The industrial revolution in the late eighteenth and early nineteenth centuries was made possible by even greater specialization. We are now seeing another wave of dynamic specialization building momentum and offering the prospect of productivity break-throughs on a global scale. As one small example, health care institutions are realizing impressive productivity gains-measured as both quality and cost of care-as they become more specialized in dealing with certain types of illness.”

“Important advances in the technology infrastructure have made possible each wave of specialization. Broader institutions play a critical role in determining the pace of deployment and the effective use of this technology infrastructure, especially in the communications arena.”

“Specialization requires connectivity and effective methods of coordination. If enterprises cannot depend on other specialized entities to complement their own activities, they will avoid specialization themselves and suffer productivity penalties as a consequence. Connectivity requires far more than communications infrastructure. Trade, financial, and immigration policies all come together to determine the level and reliability of connectivity. Educational programs play a key role in facilitating the building of social and problem-solving skills as well as helping to establish shared meaning, even at the most basic level of language instruction. Social institutions and cultures shape openness to other beliefs and practices and therefore can enhance or undermine the potential for greater connectivity.”

“By connecting with other specialized institutions, we create an opportunity for leveraged capability building-getting better faster by working with others. To do this effectively, we will need to master the mechanism of productive friction. We’ll discuss this mechanism in

greater detail in chapter 5, but the term refers to the friction that (p.5) can shape learning as people with different backgrounds and skill sets engage with each other on real problems if these people are provided with the right context. Productive friction is particularly valuable at boundaries because it exposes people to different ways of seeing problems and the potential solutions. These boundaries could be institutional boundaries, local ecosystem boundaries, or national boundaries. Again, non business institutions will play a significant role in shaping these boundaries, the opportunities to engage across these boundaries, and the tools available to enhance the productive potential of friction.”

BOOTSTRAPPING AND THE RELATIVE RATE OF CAPABILITY BUILDING

“These three elements-dynamic specialization, connectivity, and leveraged capability building-come together to help us get better faster. This book focuses on the acceleration of capability building within and across enterprises, but the opportunity and the imperative extend across all institutions. The convergence of these three elements creates a powerful bootstrapping dynamic-institutions, regions, and even countries can benefit from orchestrating these elements to move quickly from relatively limited capabilities to leading-edge capabilities, particularly in areas of specialization. Patterns of economic development around the world over the next several decades will be shaped increasingly by the relative convergence of these elements and this in turn will depend on the shift in worldview to a more dynamic, non-zero-sum game.”

“As this convergence unfolds, policy makers and decision makers will need to avoid the trap of focusing narrowly on the absolute rate of capability building. Success in the global economy will hinge on an even more dynamic notion-the relative rate of capability building, particularly in comparable areas of specialization. If one area is building capability at a more rapid rate than comparable areas, it will overtake the other areas. Compounding effects alone will lead to this result, but acceleration effects are likely to further

expand the gap over time. Capability building also tends to be path dependent, so that laggards (p. 6) have a difficult time trying to copy the process innovations of leaders.”

From Chapter One - **BEYOND MARGIN SQUEEZE**

And later, on pages 12 - 14 of Chapter One, we find the answer to the question of whether these changes could have taken place without the events that have happened in telecom and IT over the past 20 years. The answer, not surprisingly, is no.

Quoting the authors extensively again. “Rapid technology innovation in related spheres has enhanced the power and value of digital technology. Virtually everyone today knows of Moore’s Law, whereby the number of chips that a microprocessor can hold will double every eighteen months. Even more accelerated innovation drives other domains of technology. A so-called fiber law and storage law work in parallel with Moore’s Law to accelerate technology performance in related technologies. Fiber law anticipates the doubling of optical fiber performance every nine months. Storage law projects the doubling of the storage capacity of a single disk every twelve months.

In aggregate, these innovations have helped corporations extend their economic reach significantly. The innovations systematically enabled companies to reduce interaction costs - the costs required to locate resources (e.g., products from suppliers, inventories within a company, financial resources from investors, and skills of employees), obtain information about resources, negotiate access to resources, coordinate resources, and switch from one resource provider to another.

Interaction costs represent a substantial part of the cost of doing business. In developed economies like the United States and Europe, interaction costs represent as much as 70 percent of the total labor value-added costs, according to a detailed study prepared by McKinsey & Company. In developing economies like India, interaction costs are also signifi-

cant, accounting for 40 percent of labor value-added costs.

Of course, technology innovation does not automatically reduce interaction costs. To harness the full economic potential of information technology, management must change how it does business. Uncompromising companies like Wal-Mart, Charles Schwab, and McKesson became catalysts, innovating new business processes through the application of information technology, and forced others in the industry to adopt these innovations as well.

Technology innovations are opportunities not only for companies to create more value at less cost but also for customers, investors, and talent to increase their bargaining power relative to corporations by reducing their interaction costs as well. The net effect has intensified competition on all dimensions of business activity.

These innovations were accompanied by equally profound, long term shifts in public policy-shifts that systematically eroded (p. 13) traditional structural barriers to competition, thereby enabling corporations to exploit the expanded reach obtainable through digital technology.

These shifts also helped customers, investors, and talent increase their bargaining power, amplifying the parallel impact of digital technology. More specifically, three broad public policy trends are helping to intensify the war for customers. Deregulation is eroding structural barriers across industries, enabling companies to enter previously protected domains and offer new options for consumers. In the United States, competition is swelling in such industries as commercial banking, transportation, and electric utilities, and in countries around the world, governments have progressively dismantled the state monopolies and regulatory frameworks that had previously frustrated new entrants.

In tandem, trade liberalization is eroding tariff and regulatory barriers, enabling companies to compete on a truly global scale. Domestic companies that once crouched behind trade barriers are now facing competition from a growing

range of foreign contenders. Customers who once had few choices now enjoy a much broader range of options in many markets, and so their bargaining power has increased. We see this trend most dramatically in Eastern Europe, where former members of the Communist bloc are shifting to more market-driven economies.

A third set of public policy trends involves the easing of restrictions on the formation, funding, and operation of commercial enterprise, thereby creating the conditions under which new companies could intensify competition within these markets and ultimately generate new competitors on a global level. Such market liberalization began reshaping the Chinese economy in the mid-1980s, swept through Eastern Europe and Russia beginning in 1989, and hit India with broad-based economic reforms in 1991.

These public policy trends-deregulation, trade liberalization, and market liberalization-have barely begun affecting some areas of the economy. In others, they have already brought about significant change but hold the potential for greater effects over time.

Digital technology enhances the ability to exploit the resulting opportunities. Companies can support far-flung operations, setting up facilities in locations optimized for a particular business activity (p. 14) and expanding their marketing to reach new customer segments. Customers can access more information about more vendors and negotiate still more effectively with even more vendors and switch from one vendor to another whenever they find greater value.

At some level all companies are customers of suppliers for their critical business needs. As such they benefit from this shift in bargaining power. At another level, all companies have customers and will feel pressure from this shift in bargaining power. Consumers, at the end of every business value chain, ultimately benefit from these forces but all other participants will have to deliver ever more value at ever lower cost.”

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