

Why

Outsourcing and Its Perils

by Bill Lakenan, Darren
Boyd, and Ed Frey

**Cisco. Sony. Palm. Contract
manufacturers gave OEMs more supply
chain headaches than solutions.
What went wrong. What needs to be done.**

Q & A

Perhaps no company underscored the limitless potential of the New Economy more than Cisco Systems Inc. Last year, Cisco was poised to become the world's first trillion-dollar enterprise, wielding a market cap greater than that of General Electric Company in pursuit of annual revenue growth projected at 30 to 40 percent.

Two of the things that gave Cisco its glow were its development of a virtual supply chain with limitless capacity and its ability to provide extraordinarily high reliability to its customers. Another apparent strength was its approach to manufacturing: It didn't build most of what it sold. John Chambers, president and CEO, once explained, "Our approach is something we call 'global virtual manufacturing.' First, we've established manufacturing plants all over the world. We've also developed close

arrangements with major CEMs [contract equipment manufacturers]. So when we work together with our CEMs — and if we do our job right — the customers can't tell the difference between my own plants and my CEMs' in Taiwan and elsewhere."

A specialist in creating network infrastructure hardware for data and telecommunications companies, Cisco prospered as the Internet burgeoned. Between 1998 and 2000, its revenues grew by a compound annual rate of 49 percent; gross profit rose 48 percent; net income increased 42 percent.

By all outside appearances, Cisco was the picture of health and prosperity. But hidden problems were mounting. Early last year, shortages of memory and optical components began paralyzing one path of production. For the

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first time, Cisco's supply chain began to experience the kind of growing pains that affected its earnings. When the telecommunications infrastructure experienced a severe downturn, customer orders began to dry up ... and Cisco neglected to turn off its supply chain. Orders went out, parts began to pile up. Its raw-parts inventory ballooned more than 300 percent from the third quarter to the fourth quarter of 2000. Cisco's problems culminated in a \$2.25 billion write-down. In short, Cisco simply wasn't able to scale up or down as quickly as it thought it could.

Cisco is not alone in its sudden confrontation of problems in the supply chain. Witness:

- **The Sony Corporation:** A shortage of PlayStation 2 graphic chips in September 2000 meant that it could ship only half the consoles it wanted for its U.S. launch.

- **Apple Computer Inc.:** Because supplier Motorola was unable to provide enough G4 chips in late 1999, Apple's ability to fill orders was sliced in half.

- **Philips (Koninklijke Philips Electronics NV):** Suppliers' inability to produce sufficient flash memory chips threatened to disrupt production of 18 million telephones in 2000.

- **Palm Inc.:** Recent revenues might have been 10 to 40 percent higher if Palm had had access to all the liquid crystal displays (LCDs) it needed.

- **The Compaq Computer Corporation:** Starting in 1999, an inventory-less strategy led to shortages of LCDs, capacitors, resistors, and flash memory — and unfilled orders for 600,000 to 700,000 handheld devices.

All these companies had one thing in common: They had outsourced their manufacturing of essential components without a full understanding of the changes required in their business models. They didn't translate the old practices that had made them successful into their

new business relationships. They hadn't adequately codified informal communications practices and channels within their supply chain. They didn't align incentives through contract terms and agreements, which rendered it almost impossible for the supply chain to scale up in relationship to a hit product, or scale down in response to declining demand.

Outsourcing hasn't lived up to expectations for many reasons — some foreseeable and others unexpected. In the enthusiastic rush to outsource, many original equipment manufacturers, or OEMs, didn't understand how the old model worked, and never took time to understand the newer CEM business model. The result: A one-two combination that sent them reeling. Not only were they unable to take advantage of the full benefits of outsourcing, but they also exposed themselves to new and different types of risk. When outsourcing didn't work, they exacerbated their problem by pulling the wrong levers trying to fix it.

The flaw, we believe, has been with the practice of outsourcing, not the theory. A high-tech supply chain that relies heavily on outsourcing can be successful, but not if partners approach it with the wrong assumptions. Even for those companies whose participation in technology is minimal, outsourcing has the potential to be a major operational landmine. Especially in industries where product life cycles are growing shorter — set in an economy where volatility increasingly is the norm — a clear understanding of performance expectations, capabilities, and risks will separate the winners from the losers.

How Did We Get Here?

For high-tech supply chains, outsourcing was the panacea of the '90s. Traditional vertically integrated electronics

manufacturers, which had been managing products all the way from design and development through manufacturing and distribution, could slash their balance sheets by placing the low-margin operations with hungry contract manufacturers. For companies as varied as Apple, Nortel Networks Inc., and the Nokia Corporation, manufacturing was no longer where they added value; instead, they got paid for understanding customer needs, design, and distribution. Moreover, the speed with which product demand varied stressed their ability to scale up or down in response. As a result, there were tremendous pressures to get these less-profitable manufacturing assets off the balance sheet.

The contract equipment manufacturers were willing to buy these assets, and even to take short-term losses, if in turn they could count on seizing greater market share in the long term through industry consolidation. The CEMs believed they could make these operations profitable because manufacturing was their core competency, and because consolidation would allow greater purchasing power, increased economies of scale, and less exposure to market variability.

“Higher asset utilization!” the outsourcers proclaimed. “Improved scale and scalability,” they promised. Securities analysts readily accepted these claims, running up the valuations of eight major CEMs by 2,600 percent over the second half of the past decade.

Fast forward to today. High-tech has been rocked by a series of earnings announcements that have cut the Nasdaq index by as much as 68 percent from its March 2000 peak. “Growth hasn’t materialized!” the same voices shout. “The supply chain has been clogged with gobs of capacity and inventory,” they confess. Participants in this great experiment of outsourcing have been hit with lower

total earnings and with lower margins.

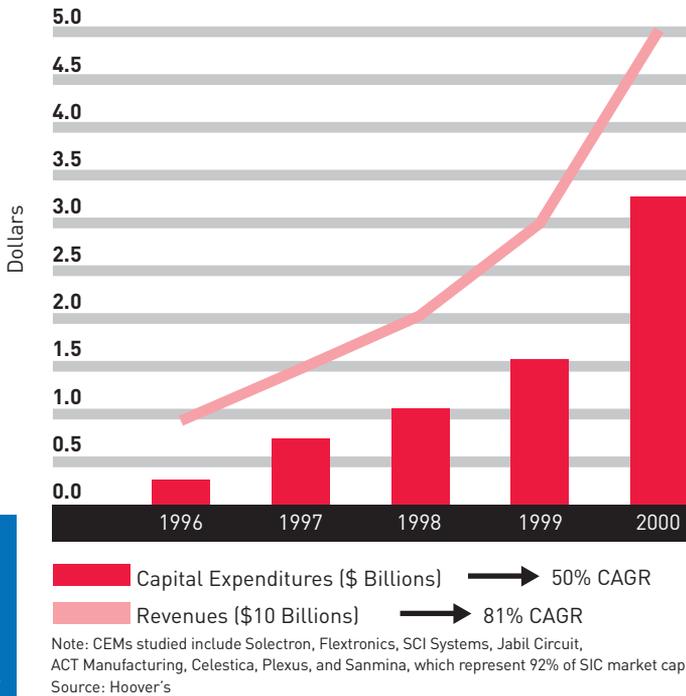
This wasn’t supposed to happen. After all, hadn’t the value chain already rid itself of the excesses and inefficiencies of fat production?

Not quite. The problem encountered by companies like Cisco, Sony, Philips, and Compaq in the late 1990s was that their in-house production capabilities — those undifferentiated, unsexy parts of their business — were increasingly no longer part of their competitive edge. It was difficult to keep the technology current. And those functions were tough to scale to meet the demands of hit-driven businesses. Asset- and people-intense parts of the business, notably manufacturing, were viewed as a distraction from the high-value parts — product innovation, marketing, and customer understanding. When it came time for businesses to choose, high value won. Companies picked up the mantra of customer focus and concentrated on getting a wider array of products to the market. Getting to market first with a hit was far more important than simply lowering production costs.

The solution was outsourcing — farm out all those prickly nightmares. Outsourcing was greeted as more than just a strategy; it was hailed as a cure-all for whatever ailed the technology sector. The theory was that manufacturing specialists — companies like Solectron, Sanmina, Celestica, Flextronics, and Jabil Circuit — could bring greater focus and expertise to projects, could develop procurement and risk efficiencies better than OEMs, and could lead in innovation if they were encouraged to do so.

We studied eight major CEMs — Solectron, Flextronics, SCI Systems, Jabil Circuit, Celestica, ACT Manufacturing, Plexus, and Sanmina — that together represent 92 percent of the Standard Industrial

Exhibit 1: CEM Industry Growth



Classification market cap. From 1996 to 2000, capital expenditures grew 11-fold, revenues increased almost 400 percent (see Exhibit 1), and market capitalization experienced an exhilarating compound annual growth rate of 87 percent. The Solectron Corporation itself is a lesson in CEM expansion. (See Exhibit 2.) In 1997, it extended its presence with just one new acquisition. In 1998, it picked up another five; in 1999, 10; and, in 2000, it surpassed the total number of acquisitions in the previous three years with 27.

In deal after deal after deal, the partnership announcements were the stuff of headlines: In 1998, Silicon Graphics Inc. signed a five-year supply deal with Celestica Inc. The following year, SCI Systems Inc. entered into outsourcing arrangements with the NEC Computer, Marconi, and Dell Computer corporations. In 2000, the five-year, \$30 billion agreement between Motorola Inc. and the Flextronics Corporation made a four-year, \$10 billion pact between Nortel and Selectron seem slight by comparison. Wall Street followed the deal-making with its own kind of gushing praise, rewarding the CEMs and OEMs with bigger market caps while touting their ability to:

- **Deliver Better Economics.** By consolidating production volumes from multiple customers, CEMs could fill their factories and minimize downtime with a portfolio of products across a portfolio of lines. By filling the lines, they spread their overhead thinner. And they weren't

exposed to gaps caused by the ebb and flow of a collection of hit-driven businesses. By aggregating component volume from multiple customers, CEMs could buy parts in bulk and at lower costs.

- **Improve Scalability.** With access to “plug-and-play” assembly lines, the CEMs could establish standard practices that would enable them to turn on a dime to start or stop product manufacturing. Because they had plenty of materials on hand, they would also be able to react better to changes in macro demand.

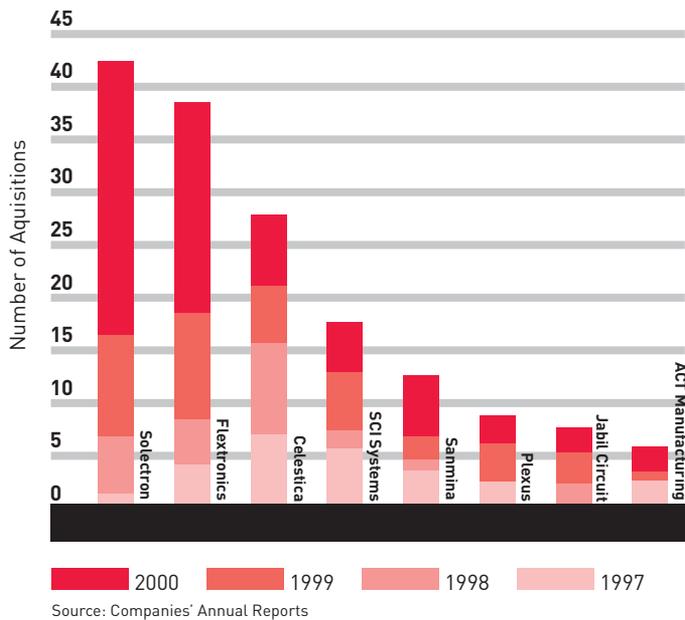
- **Reduce Inventory.** Contract manufacturers could pool the inventories of multiple customers on similar items — components and boxes, to name two — and reduce overall inventory levels and costs while maintaining effective coverage against changes in demand.

- **Create Distribution Benefits.** When CEMs possessed the right geographic footprint, shipping the finished good directly to end-users was a viable option.

- **Sharpen Focus.** Outsourcing the essentially commoditized manufacturing functions would allow OEMs to concentrate on their core capabilities — innovation and owning the customer. The CEMs' greater experience in manufacturing would yield quicker ramp-up of new products, smoother production processes, and speedier solutions to unexpected problems.

CEMs enthusiastically tooled up to accommodate outsourcing. They grew in scale — Solectron alone acquired 53 facilities and production contracts over three years — and increased their scope of work. To become one-stop shops, CEMs moved from simple board-stuffing to complete assembly of sophisticated components, as well as such higher-value activities as testing and after-market support. By providing more services, they set out to become a more integral part of the manufacturing

Exhibit 2: CEM Industry Acquisitions



process while creating stickier customer relationships. Indeed, for the next several years, the fates of Nortel and Solectron are inextricably bound together by a supply contract that all but mandates a seamless partnership.

The CEM industry's total market was estimated at \$120 billion in 1999, or 15 percent of the \$800 billion potential market for contract equipment manufacturing identified by the high-tech market research firms IDC and Forrester Research. Analysts predicted that CEMs would capture more than 40 percent of this outsourcing market (primarily computing and communications hardware products) by 2004.

The future looked rosy.

The Fall

Welcome to 2001. The OEM/CEM high-flyers have fallen dramatically.

No one is trumpeting the miracle of outsourcing. An alarmingly long list of tech-related manufacturers have experienced reversals of fortune. Today's stories are more often about earnings warnings, operational problems, earnings shortfalls, and layoffs. Compaq announced that it would miss first-quarter earnings estimates by as much as one-third. Ericsson SpA posted a first-quarter loss of \$485 million. Motorola, reporting its first quarterly operating loss in 15 years, was short by \$206 million. Nortel announced a layoff of 10,000 employees in February. Dell announced a layoff of 1,700 in February, and an additional 3,000 to 4,000 in May. And the CEMs haven't been spared either. In April, Solectron announced that it

would close a plant and lay off more than 1,000 employees, and Flextronics announced a layoff of 7,000.

The warning signs had been there for those who wanted to look for them. You can see the problems when you explore both the OEM and the CEM businesses.

Early on, OEMs were wracked with day-to-day execution problems. Whereas OEMs had difficulty forecasting product demand, CEM shortages forced them to miss deliveries; systems implementations took longer than expected; and other problems kept the supply chains from scaling up as fast as promised. When infrastructure development slowed and markets failed to materialize, OEMs cut forecasts. Dramatic revenue shortfalls were compounded by the OEMs' inability to step back from their commitments to inventory and capacity. As a result, balance sheets became bloated. Profitability forecasts at the unit level took a direct hit. And customers complained as the marketing machines continued to help create unfulfilled demand. The overall message was clear: The OEM/CEM model didn't scale.

When the OEMs were bruised, CEMs felt the pain as well. Solectron held on to inventories more than two weeks longer in the second quarter of 2000 than in the fourth quarter of 1999 to cover its uncertainty about component availability. As its customers stocked up to ensure their own ability to meet delivery commitments, Solectron incurred inventory-holding penalties and obsolescence costs associated with the inventory bubble. Solectron makes its money by marking up parts. When it's forced to hold on to extra inventory, it can't make money. Solectron doesn't have a lot of margin to give away to its customers; even a bit of incremental cost significantly affects the bottom line. CEM margins are generally thin — often just 3 to 4 percent.

Like Lucy and Ethel in the chocolate factory, Cisco was left with a glut of product and nowhere to put it. It's impossible to hold a fire sale in high tech.

Problems even surfaced around specific components. OEMs' inability to plan and forecast needs created an error-filled picture for producers, and shortage issues were most acute around highly sought-after parts. Philips's threatened shortage of 18 million phones showed just how risky the shortage of a single component could be.

The sum of the pieces create a frightening whole: The aggregate market value loss of 12 major OEMs — Cisco, Dell, Compaq, Gateway, Apple, IBM, Lucent, Hewlett-Packard, Motorola, Ericsson, Nokia, and Nortel — over the period from March 2000 to March 2001 exceeded a staggering \$1.28 trillion.

The promise of outsourcing seems to be overstated. The OEM/CEM model doesn't look that much different from the vertical world, except it's not as efficient. And because experience has exposed weak links in the value chain, the decision to outsource — along with the coordination that must support that choice — has become much harder.

Lessons from Cisco and Compaq

Let's return to Cisco and see how everything we've just told you applies to its precipitous fall.

Certainly, growth in the networking equipment sector slowed and contributed substantially to Cisco's earnings shortfall. There are some indications, however, that the OEM/CEM model it employed was a contributing factor as well. There's no question that Cisco was at the forefront of adopting outsourced production solutions. Indeed, the company locked in access to capacity when production lines weren't running at full capacity, ensuring its ability to scale up better than its competitors.

But as customer demand increased — as much as 50 percent or more year on year — Cisco's suppliers strug-

gled to keep up. Cisco did a better job than most managing through unpredictable shortages to maintain a high level of customer commitment. Nonetheless, the company was hit by parts shortages that slowed delivery, and by October 2000 it faced a \$3.8 billion backlog in customer orders. The shortages limited its ability to satisfy customer demand as the market was peaking, ultimately limiting the company's profitability.

It turns out that there was a more sinister side to that customer commitment. Cisco's focus largely blinded it to the possibility that demand might not continue to materialize. When the market dried up, Cisco found itself saddled with the extra capacity that it had put in place to meet potential demand. The resulting \$2.25 billion overhang reflected the company's outstanding contracts with CEMs as well as a measure of all the inventory it needed to write down.

Like Lucy and Ethel in the chocolate factory, the company was left with a glut of product and nowhere to put it. Unfortunately, it's just about impossible to hold a fire sale in high tech. Technology will go through two or three generations of advancement before the customers — large institutions steering around gigabytes of data — will again be ready to procure product. So although some common components like flash memory might be mined for other uses, most of the value in the core chip sets, assembly integration, and tests is lost.

How well did outsourcing work in delivering the promised benefits in Cisco's case? The report card we'd give to the company and its contractors provides some perspective. (See Exhibit 3.) Cisco overcommitted to inventory and capacity as the market was taking off and forecasts were rosy. As the forecasts vaporized, the company was unable to rid itself of the excesses. It couldn't fix its

Exhibit 3: Cisco Outsourcing Report Card

Project	Grade	Comments
Economies (utilization/scale purchasing)	B-	<ul style="list-style-type: none"> • Filled factory, but utilization plunged on downturn • Purchasing economies' benefit was much smaller than the cost of lost sales
Scalability	C	<ul style="list-style-type: none"> • Capacity scaled nicely to projected demand, although shortages did constrain output and earnings materially • Unable to cut bookings as effectively, so earnings suffered
Inventory (better coverage; lower investment)	D	<ul style="list-style-type: none"> • In May 2000, shortage of optical components and memory chips extended delivery time from 3–5 days to 8–10 weeks • Between January and October 2000, inventory turnover dropped by 35% (from 25.8 to 16.4 turns/year) • Created a \$2.25 billion inventory write-off
Distribution (shipping; market access)	B	<ul style="list-style-type: none"> • Did spread production portfolio close to the customer and increase confidence in deliveries as a result
Focus (innovation; customer responsiveness)	A	<ul style="list-style-type: none"> • Earned best-of-class reputation for delivering on commitments and being the last to experience executional problems
Final Grade	C	<ul style="list-style-type: none"> • Didn't deliver cost performance on the way up or down • Added an extra tier to the supply base and exacerbated problems

virtual production system with inventory, and it couldn't take out capacity when it most needed to. The poor utilization of assets drove the company to announce its first-ever quarterly loss last spring. Lest anyone miss the magnitude of the miscommunication in all the murk, Cisco had to concede in its April 29, 2001 quarterly earnings announcement that it was unsure how large its total write-down was — it was within a \$300 million range.

Cisco is just one of several technology enterprises that have struggled with outsourcing.

In late 1999, Compaq decided it needed to revive its lagging commercial PC sales. The company announced a hot new product line: the Ipaq series of handheld devices, with full-color screens, multimedia capabilities, and unmatched portability.

The Pocket PC, introduced under a direct sales/inventory-less strategy, quickly became the company's biggest hit. Demand for the device outpaced supply 25 times, and Compaq executives were enthusiastic about its market potential. Michael Winkler, executive vice president of Compaq's Global Business Units, told *Fortune* last March "...If you take the units, accessories, and some of the services that go along with it, it's a larger market in 2005 than the traditional PC market."

After the 2000 second quarter, however, demand for handheld devices in general was outpacing supply, and

most companies, including Compaq, Palm, IBM, and Ericsson, were losing customers and orders. Compaq's CEO, Michael Capellas, captured the industry's sentiments: "...The supply problems have had more to do with unexpected demand. We expected sales of about 7,000 per month but are a lot closer to 100,000." A shortage of LCDs, and basic components like capacitors, resistors, and flash memory, had crippled the entire handheld devices market. Securities analysts estimated that Palm's revenues, for example, might have been 10 to 40 percent higher if it had been able to get its hands on as many LCDs as it needed. Compaq, whose inventory-less strategy led it to outsource manufacturing of the handheld to the Taiwan-based High Tech Computer Corporation, was hit just as hard. "We have unfulfilled orders for 600,000 to 700,000 devices," a Compaq vice president told Bloomberg News. Any time he wanted a reminder of that shortage, that vice president could log on to auctions at eBay and Amazon.com, where Pocket PCs were selling for \$700 to \$800, well above their \$499 retail price.

Suppliers who had their eye only on their own margins concentrated on producing only those components that gave them the greatest return on their manufacturing investment. Ken Dulaney, an analyst with Gartner, observed, "Everybody wants to make processors, because there's a lot of margin in them.... But the little things

Exhibit 4: Compaq Pocket PC Outsourcing Report Card

Project	Grade	Comments
Economies (utilization/scale purchasing)	B	<ul style="list-style-type: none"> • Turned profitable with introduction of the hit
Scalability	Incomplete	<ul style="list-style-type: none"> • We really can't tell • Satisfied less than 10% of identified demand • Recently spent an additional \$700 million to increase CEM production
Inventory (better coverage; lower investment)	D	<ul style="list-style-type: none"> • Critical and non-critical component shortages prevented scale-up • Poor forecasting created confusion among the portfolio of suppliers and integrators
Distribution (shipping; market access)	Incomplete	<ul style="list-style-type: none"> • Channels starved because of lack of production
Focus (innovation; customer responsiveness)	A	<ul style="list-style-type: none"> • Introduced unique compromises to unclog the value chain (e.g., a black-and-white screen to replace the scarce color LCD)
Final Grade	C	<ul style="list-style-type: none"> • \$47 million in lost sales over 9 months • Expecting another 1 to 2 months of similar difficulty

around [the processor] — capacitors, resistors, support chips — we're short on. And I think the problem is going to get a lot worse." Compaq's Mr. Capellas showed no greater optimism: "I think [shortages] will be with us all for six to nine months; it's forcing us to adopt some very, very good practices, like making sure our demand forecasts are a lot better."

Capacitor manufacturers did respond to the shortages, running their plants three shifts a day, seven days a week. Although production capacity is starting to expand, the pace is hardly breakneck. At pennies apiece and with tiny commodity margins, capacitors and resistors need to be sold in major quantities to support the kind of growth necessary to underwrite a fully responsive new factory.

Soon after the parts shortage started, most PC and electronics manufacturers missed their 2000 year-end quarterly earnings and revenues and revised their 2001 outlook, blaming the general downturn in the U.S. economy. Compaq itself missed fourth-quarter 2000 earnings and revenues after a record third quarter, and later in March cut 5,000 jobs.

The Compaq report card helps provide an overview. (See Exhibit 4.)

Outsourcing: The Diagnosis and Prognosis

No two outsourcers have identical problems. Some OEMs were unable to construct an outsourced supply chain that allowed them to bail out when growth didn't

materialize. Others, like Compaq, were unable to coordinate the efforts of the value chain links in a way that increased total system capacity. Both found that traditional techniques, like flooding the pipeline with inventory, did not yield a solution.

Why don't the old solutions work? Because moving to an outsourced model fundamentally changes your business, and the old rules don't necessarily apply.

A number of OEMs outsourced manufacturing without recognizing this and incorporating these changes into how they designed their new supply chain. As a result, a lot of OEM/CEM relationships simply were structured poorly. When the chains were put into operation, the wrong tools and approaches amplified problems involving shortages and coordination. Most of the problems fell into two categories: old vertical thinking and misalignment of agendas.

Old Vertical Thinking. OEMs were guilty of old vertical thinking, or trying to run the supply chain as though it were all still under one roof.

Before outsourcing changed the rules, OEMs could take advantage of such in-house production capabilities as capacity; the ability to make changes; and the ability to turn around prototypes. Because marketing goals, R&D goals, and manufacturing division goals often were aligned at the corporate level, trade-offs could be negotiated internally to facilitate production. When manufacturers moved some of these basic functions out of house,

they either were charged for those “special” — i.e., outside the contract — services or just couldn’t get them.

Old vertical thinking was not limited to OEMs. By insisting on business as usual, CEMs also lost access to informal communication and problem-solving channels. The water-cooler comment from the marketing department that “the way these things are selling we may need to work that extra shift after all,” or the flexibility to grab the critical spare parts locked in the just-in-case closet, wasn’t available. In fact, the CEM negotiators probably didn’t even realize that such options existed when they constructed the terms for the OEM relationship. And when the grease that smoothed the product flow was not available, the value chain ran rough.

The unwritten values and objectives didn’t easily translate to the new relationship, either. The supply contract was harder to define than the old relationship between divisions in a vertical company, in which knowledge of the needs of the company (and how to fulfill them) was shared as a matter of course. Formal contracts simply couldn’t capture that attitudinal energy — the kind of corporate-wide entrepreneurial spirit that had made so many OEMs successful. Although CEMs did have the same level of commitment, their problem-solving methodology and their seeming inflexibility were foreign to the OEMs. On a very basic level, many CEMs had no idea what their OEM partners were talking about.

Misalignment of Agendas. OEMs and CEMs run their businesses with different sets of goals and different methods for achieving them. OEMs, with more comfortable margins, focus on early penetration and rapid market share growth to generate profits. CEMs, operating with razor-thin profit margins, need to maintain an aggressive focus on cost. Although the CEMs and the OEMs were

able to create a balance of cost and capacity at the outset of their relationship, their plan was destroyed by market and supply variability. OEMs, to achieve their goals, need flexibility — the kind of agility that allows them to divert resources to a given product as it becomes a hit. CEMs, on the other hand, need predictability — they want to make commitments in advance to reap benefits like big-lot purchases and decreased overtime. The OEMs’ tactics, therefore, keep them from making the firm commitments the CEMs need to keep their costs down. Indeed, when OEMs begin to engage in the sort of longer-term commitments that CEMs need, their flexibility is reduced almost immediately. When times go bad, their different techniques for fixing problems are incompatible.

Several conflicts emerged from such misalignments of agendas. The OEMs and CEMs had different inventory targets — OEMs wanted the pipeline full, whereas CEMs doggedly adhered to the terms of their contract. They had different appetites for surge capacity — OEMs were willing to pay for lower utilizations and just-in-case capacity, whereas CEMs were committed to consolidating the industry for better unit-cost production. OEMs were connected to the customer and would change the production mix to maximize production of the hits. CEMs generated margin on parts markups and were enormously sensitive to buying incremental, high-cost inventory on the spot market that accompanied mix change.

CEMs have even punished OEMs for not building to the original forecast. As an example, a producer of specialty handheld computing devices sourced its production with a major contract manufacturer. The OEM committed to a build schedule with a frozen production window. Inside that window, the OEM couldn’t change anything about the quantity or product mix it was buying from the

Exhibit 5: High-Tech Supply Chain Definition and Operation

Critical Business Questions	Traditional Approach	Emerging Approach
What does the product look like?	<ul style="list-style-type: none"> Minimal configuration changes tied to major model 	<ul style="list-style-type: none"> Faster turnover with increased effort to extend successful lines with derivatives Changes of configuration to fit available parts and capacity
What technology/processes?	<ul style="list-style-type: none"> Unique application 	<ul style="list-style-type: none"> Commoditized
What does the chain need to accomplish?	<p>Deterministic and understood on the front end</p> <ul style="list-style-type: none"> Identify market requirement Pick service levels/policies Capacitize and operate 	<p>Stochastic and emerging</p> <ul style="list-style-type: none"> Identify a set of likely outcomes Define service levels/policies Capacitize to baseload Revisit with market feedback
How do we structure the chain?	<p>Vertically integrated</p> <ul style="list-style-type: none"> Provides reserve capacity for the hits Instinctive, if not explicit, understanding of need for quick entry and scalability 	<p>Horizontally integrated</p> <ul style="list-style-type: none"> Better economies of scope and scale No reserves. Access to parts and capacity formalized
How do we manage the systemic issues?	<p>Loosely applied</p> <ul style="list-style-type: none"> ERP Back channel communication Insurance (extra inventory, padded lead times, shadow capacity) 	<p>Formalized</p> <ul style="list-style-type: none"> Formal ERP and eERP Good visibility Embedded controls that guide the right behaviors without constraining possibilities
What are performance expectations?	<ul style="list-style-type: none"> Target unit cost over a small range of production volumes Quick to market, but not necessarily quick to ramp up Scalability based on ability to pick the “right” sizing on the front end Scalability is limited Reactive — drives chain to lowest cost-to-serve given experience Local, not global optimum 	<ul style="list-style-type: none"> Unit cost in a range, but secondary to scalability considerations Cost of capacity controlled through judicious application to rest of portfolio of products Proactive — drives chain to highest profitability with added insight into market direction 90% of the global optimum — fast

CEM, which manufactured a range of products for the OEM. But when the market moved, the OEM wanted to change the mix. The OEM agreed to take some production out of the line (“we’ll let you net down on the stuff you don’t need”), but wouldn’t allow the OEM to add new items. The OEM was punished for trying to do the right thing. Ultimately, this behavior led to further system-induced variability, as marketing at the OEM inflated forecasts to create shadow capacity, and the CEM lost its purchasing advantages.

Outsourcing and the New Supply Chain

We look at the rubble of what was outsourcing and now hear a new set of proclamations: “Stop the old vertical thinking!” they say. “Align expectations!” — once again, great slogans. But, this time, what do they mean? The answer lies in the design (and operation) of the new supply chain.

Production and assembly processes have become much more stable, and a variety of tools have emerged to handle the day-to-day interaction around the supply chain. OEMs need to pick and choose among these capabilities carefully in order to create an integrated supply web. It’s not a simple value chain anymore. OEMs have to satisfy a range of possible demand profiles with a portfolio of customizable capacity. This much we have learned: Although there are any number of options to build with (different plants, product flows, configurations), the OEMs can’t predict with any accuracy the specifications of what they will need.

While designing the new supply web, they need to keep this uncertainty in mind. The web needs to be adaptive so the OEMs can create global, integrated, dynamic networks of suppliers that find the lowest risk and cost for any given situation. OEMs need access to — and the ability to turn off — big chunks of production more quickly

The flaw is with the practice of outsourcing, not the theory. OEMs never took time to understand the new CEM business model.

than ever contemplated in order to capture profitability.

Although the process for creating and producing a single electronic product has become fairly routine, no OEM has mastered the coordination of a web that provides easy, cost-effective access to all those potential outcomes. In order to do this, OEMs must recognize the differences between the old supply chain and the new web. (See Exhibit 5.) From these points of difference emerge some guidelines OEMs can use to reinvent outsourcing as a viable model. Companies that master them will turn their big cost and speed advantages into dominance of their competition. These guidelines include:

- **Active Capacity Management.** Think of capacity as a portfolio, and manage it in such a way that you maintain capacity for the baseload as well as the surge when (optimistically speaking) your product takes off.

- **Progressive Supplier Relationships.** Build relationships with suppliers that allow you flexibility over time. We call this rolling commitment — reserving aggregate capacity in the long term and then specifying exactly what that reserved capacity will be used for closer to the actual production date.

- **Coordinated Production Planning.** Use a “federated” approach to planning the product and linking the production system; an approach that allows for alternatives instead of insisting on precise commitment.

- **Flexible Product Configuration.** Identify some room in the configuration to allow for variations in availability. There are always trade-offs in the design that you can make to help manage around parts shortages.

- **Iterative Learning.** View the aligning of the supply web for each particular product as a “design, launch, and learn” effort. This is a completely new approach — you don’t just launch, you design and adapt your supply web

over time. You can’t afford to paralyze yourself while seeking the perfect solution. Reducing the time required for the alignment is the key to profitability. It’s better to start working and correct as you go along than to wait for the perfection and miss the opportunity entirely.

Companies today are confronted by a new reality. Gone are the days when owning and controlling every aspect of the business was desirable, or even possible. Outsourcing is here to stay. But just as traditional manufacturers stumble when their processes fail to scale, outsourced enterprises fail if their relationships cannot scale effectively on the upside and the down. For outsourcing to work, OEMs and CEMs must look beyond the deal. They need to step back and reevaluate their relationship, realign the processes, and evolve as the market moves. Only with adequate attention to both the why and the how will outsourcing deliver on its promise. +

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Resources

Scott Buckhout, Edward Frey, and Joseph Nemecek Jr., “Making ERP Succeed: Turning Fear into Promise,” *s+b*, Second Quarter 1999; www.strategy-business.com/technology/99208/

Lawrence M. Fisher, “From Vertical to Virtual: How Nortel’s Supplier Alliances Extend the Enterprise,” *s+b*, First Quarter 2001; www.strategy-business.com/casestudy/01113/

Keith Oliver, Anne Chung, and Nick Samanich, “Beyond Utopia: The Realist’s Guide to Internet-Enabled Supply Chain Management,” *s+b*, Second Quarter 2001; www.strategy-business.com/special/01209/

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