



**E-commerce  
and the  
virtual  
chemical  
company**

**W**alls of brick and mortar are tumbling down as e-commerce creates virtual chemical companies. Virtual what? Virtual companies are communities of conventional businesses that cooperate in ever-shifting alliances. They concentrate on their core competencies—like manufacturing chemicals—and let others take over secondary pursuits, such as trucking, packaging or whatever. In some cases, chemical companies may even hand over manufacturing operations to partner companies.

“No longer will a single entity have to take orders, make product, deliver the merchandise, warehouse the inventory, manage maintenance and build a plant,” said Leif Erikson, research director of manufacturing strategies for AMR Research, Boston.

The Internet allows companies to form alliances easily because people no longer need to work in adjacent offices. They can work in real time, even when they’re in different cities or distant parts of the world.

Alliances could splinter and reform to create different virtual companies for different markets, Erikson said. He noted that “a given real company might belong to several virtual companies or communities that deal with different end users.”

And the era of virtual companies is under way. E-commerce is already

transforming the work lives of 10% of the nation’s chemical plant professionals, and another 35% expect to feel the shock waves of change soon.

“What the Internet (and e-commerce) does for businesses,” Erikson said, “is reduce the cost of transactions—not just physical transactions but also information transactions.”

### E-commerce—the next wave

What’s brewing? Call it the e-economy.

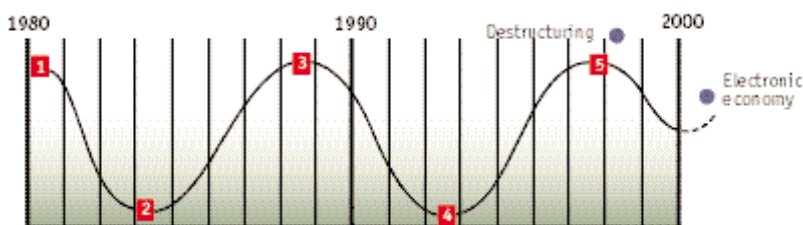
“The adoption of e-commerce is the first sign of the rapid emergence of the e-economy,” said Russell Gowland III, a partner at Arthur Andersen Consulting, Detroit, and head of e-commerce initiatives in Andersen’s Global Chemical Practice.

“The increasing presence of e-commerce,” Gowland said, “will emphasize value creation opportunities based on novel economic assumptions and business models. This is a financial paradigm totally new to today’s chemical industry.”

E-commerce is already driving change all along the chemical industry supply chain, Gowland said. New e-commerce-based companies—whose success comes from owning “virtual” customer relationships rather than plants—have sprung up to trade chemicals over the Internet.

Chemical leaders have responded,

**Fig. 1. A wave shows how quickly change has come to the chemical industry. Welcome to the electronic economy.**



- 1** Diversity into specialties, broad portfolio, “away from cyclicity”
- 2** Invest in new plants, globalize, geographic spread, bigger is better
- 3** Overcapacity, reduce costs, competence, portfolio review, industry solutions
- 4** Partnerships, Asia—the region of promise, focus on the core, empower BU’s, reengineer, downsize
- 5** Shareholder value, corporate restructuring, global BU’s, invest overseas, grow/focus via acquisition/JV’s, emphasize specialties, life science focus, R&D for growth, outsource noncore activities

Source: Andersen Consulting

recognizing that differentiation will come from providing customers information and services as well as product, he continued.

So how big is the coming wave of e-commerce in the chemical industry? Recent research suggests that a projected \$20 billion in domestic Internet chemical sales in the year 2000 could soar to nearly \$180 billion by the year 2003, which represents about 40% of the U.S. chemical market over a range of chemical products (see Fig. 2). On a global scale, Forrester Research points to explosive growth in e-commerce business-to-business trading from \$43 billion in 1998 to \$1.3 trillion in 2003.

### First of the independents

Emerging on the scene are a plethora of independent trading exchanges (ITE's), which have the potential to create virtual marketplaces.

While the chemical industry lags behind the electronics and high tech sectors in adopting e-commerce in general,

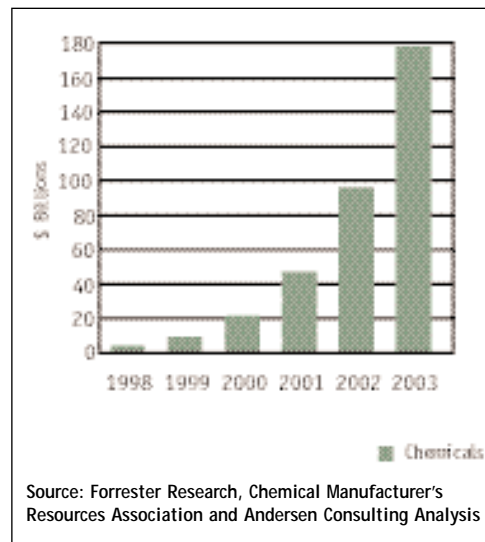
it is on par with any manufacturing group in establishing ITE's, such as San Francisco-based ChemConnect, Ann Arbor MI-based e-Chemicals or Houston-based CheMatch. Others include SciQuest in Charlotte, NC; Chemdex, a directory of chemistry on the Internet from the University of Sheffield, England; PlasticsNet.com in Chicago; PlasticsBin.com; Harbinger.net; and VerticalNet in Horsham, PA (see Table 1 for more ITE's).

ITE's are a new business model. Scott Latham of AMR Research said that "ITEs are in their infancy and must overcome significant hurdles."

He pointed out that the ITE market resembles other high-tech industry startups. ITE's are securing financing, dealing with established competitors and validating business models.

"Not all ITEs deliver the same func-

Fig. 2 Projected U.S. Internet chemical sales



tionality," Latham said, "and there will surely be a shake-out."

### The switch to virtualization

The chemical industry is about to undergo a transformation like the one that has gripped the computer and financial services sectors, according to David Dickinson, a partner in PricewaterhouseCoopers (PWC) Global Chemical Practice in Dallas. The company's "Four Box Model" for e-business describes the evolution companies will undergo (Fig. 3).

Stage III in Fig. 3, "Industry Transformation," will occur when businesses link with their strategic partners to form virtual organizations.

Most chemical companies have already reached Stage I, "E-commerce Channel Enhancement," and some have attained Stage II, "Value Chain Integration." Stages III and IV represent what lies ahead. Dickinson said Fig. 3 is not necessarily a linear progression and that companies can be in more than one stage at a time.

Andersen's Gowland provided a three-point plan for moving ahead in the e-commerce and e-business arena: "Think big; start small; and scale fast." His advice is shown in Fig. 4. "Think big," he said, "but don't underestimate the complexity. Delivering e-commerce solutions is complicated and risky. A

Table 1: Chemical industry Independent Trading Exchanges (ITE's)

Industry	ITE name	Comments
Chemical	ChemConnect	Offers a wide range of chemical categories Supports anonymous posting and audit trail Transaction consummated offline between two parties
	eChemicals	Supports prenegotiated pricing terms Supports auction capability Focused on providing value to smaller, knowledgeable buyer with repetitive buys
	CheMatch	Strong spot market focus within the following chemicals: benzene, xylenes, paraxylenes, orthoxylenes, toluene, methanol, MTBE and styrene monomer
Life Sciences	SciQuest	Laboratory supply ITE Offers integration via EDI or batch flatfile Marketplace and auction capability
	Chemdex	Rationalized data and supports internal work flow Integration offered with Ariba and published API's Public company recently acquired ProMedix.com, a medical equipment ITE
Plastics	PlasticNet.com	Plastics, resins and equipment Exchange and auction capability Consolidates multiple suppliers to one PO
	PlasticBin.com	Part of NetVendor's SurplusBIN.com site Primarily obsolete and excess inventory
Miscellaneous	Harbinger.net	Recently launched HVAC Online, Plumbing OnLine and GroceryLink Hosts sites and provides transaction services
	VerticalNet	Hosts 47 different business communities across 10 industry sectors Primarily an information-based level of functionality

Source: AMR Research, Boston

prudent organization can start small to gain experience while still reserving the right to play. Getting started is not enough. Early success must be sustained, or momentum will be lost. And, in order to scale fast, the right leadership and culture must be cultivated and a strategic technical architecture must be developed.”

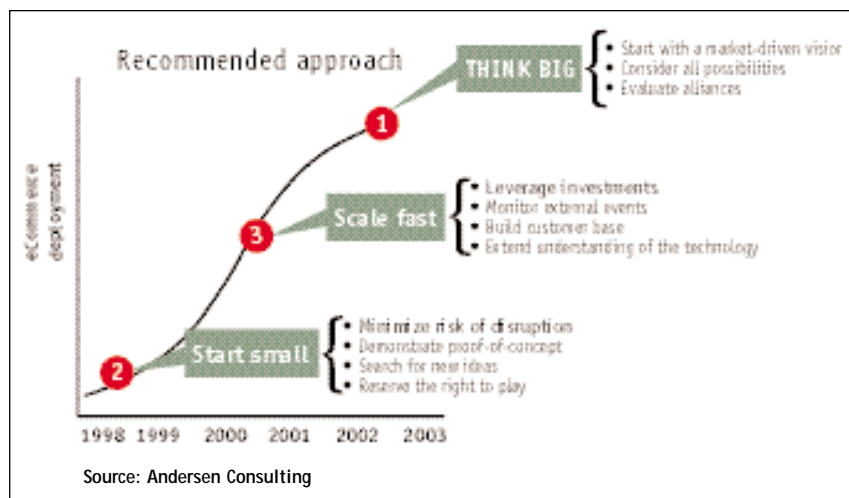
PWC’s Dickinson said tighter integration with suppliers will continue when companies make preferred supplier arrangements based on more than price and product quality.

“The truly preferred strategic supplier,” he said, “will not only deliver the right product at the best total cost of service but will also work proactively to reduce total supply chain costs. Cost reductions could come from e-procurement, e-logistics, product development, collaborative planning, product configuration, customer-customized Web pages, electronic document management and product life service.”

### In the plants

What does the virtual chemical company mean to people in the plants? Fundamental change. Following the DaratechPlant 2000 conference in Houston on Jan. 27, Charles Foundyler, president and CEO of the Boston-based research organization that sponsored the event, was inspired to observe that “the competencies upon

Fig. 4 The required mindset for e-commerce



which owner-operator firms and engineering-procurement-construction (EPC) firms base their differentiation is radically changing. Web-based information technology (IT), e-commerce, globalization and the incredible advances in IT will reshape these enterprises and change the way companies compete.”

Foundyler referred to “the empty EPC,” and drew a parallel to the empty factories of a former time. Under his scenario, EPC firms that become agile at information technology, have smart use of e-commerce and know how to reinvent themselves will win in the world of virtual business.

Instead of having a 15-floor EPC

central headquarters, for example, they’ll need just two floors because they’ll be extremely good at finding inexpensive labor from all over the world. The future EPCs will take over more of the operation and maintenance of the plant, but much of it will be done from remote locations and e-procurement on the Web will take on paramount importance.

The owner-operators and EPCs will share an integrated computing environment. Operations and maintenance may be outsourced to someone who might even operate competitive plants.

So the competitive advantage will shift from manufacturing efficiencies, which will be equalized in the industry, to areas like savvy use of information technology, e-commerce and alliances with suppliers and customers.

Wow.

Does it mean that e-commerce will help create virtual companies—communities of cooperating businesses that concentrate on their core competencies? It sure seems to be moving in that direction!

By Peter J. Knox, Editor-in-chief and associate publisher

**Editor’s note: For more on the plant operator of the future and savvy use of information technology, see the Editor’s Page (pg 9) and “Resurrection of life-cycle costing” (pg 74).**

Fig. 3. Here’s the e-business adoption curve for chemicals

