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**Adjust magnification as needed to read on-line, or print to read hard copy.**

# Manufacturing Management Focus

## How CIMC Became the Dominant Ocean Container Manufacturer in the World

**Excerpt from "Dragons at Your Door" Demonstrates Competitive Power of "Cost Innovation" by Chinese Manufacturers; How can Western Companies Compete?**

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*The following is an excerpt from the new book "Dragons at Your Door: How Chinese Cost Innovation is Disrupting Global Competition" by Ming Zeng and Peter Williamson*

### By Ming Zeng and Peter Williamson

Forget the idea that the rise of Chinese competitors simply means cheap, low-quality imitations flooding world markets. Chinese companies are starting to disrupt global competition by breaking the established rules of the game. Their tool of choice is **cost innovation**: the strategy of using Chinese cost advantage in radically new ways to offer customers around the world dramatically more for less. Cost innovation has three faces:

- First, Chinese companies are starting to offer customers high technology at low cost.
- Second, the emerging Chinese competitors are presenting customers with an unmatched choice of products in what used be considered

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standardized, mass-market segments.

- Third, Chinese companies are using their low costs to offer specialty products at dramatically lower prices, turning them into volume businesses.

The cost innovation challenge presented by Chinese companies is disruptive because it strikes at the heart of what makes many businesses in

high-cost countries profitable today. It threatens their ability to earn high margins on high technology. It undermines their ability to extract a price premium by offering customers more product variety and greater customization. And it means that even if they use their specialist knowledge to move upmarket into niche segments—above the fray of low-cost competition in the mass market—they risk being blown away as the Chinese explode these niches into volume

### **Cost Innovation in Action**

The dynamics of how cost innovation can be used to displace established competitors from the core of a market, and the consequences that follow, are nowhere better illustrated than in the case of China International Marine Containers Group (CIMC).

Already global number one in terms of volume in 1996, today CIMC is six times larger than its nearest competitor, dominating the world of shipping containers with more than 55 percent global market share. But far from being just a low-end, volume producer, it has penetrated every segment of the container market. Driven by its corporate slogan “learn, improve, disrupt,” CIMC has captured one segment after another, including products with sophisticated refrigeration, state-of-the-art electronic tracking, internal tanks, folding mechanisms, and customized features—all niches that specialist European container makers believed they could defend, despite their high costs. In 2005 it bought up 77 patents from a bankrupt competitor Graaff—ironically the German firm from which CIMC licensed its first refrigeration technology back in 1995. One year earlier it acquired a 60 percent shareholding in Clive-Smith Cowley, the British company that invented the proprietary “Domino” technology that allows empty containers to be “folded” for ease of back-hauling.

The logo for EPICOR, featuring the word "EPICOR" in a bold, blue, sans-serif font with a slight shadow effect.

***The cost innovation challenge presented by Chinese companies is disruptive because it strikes at the heart of what makes many businesses in high-cost countries profitable today. It threatens their ability to earn high margins on high technology.***

As a result, CIMC is now a major force in setting the new global standards for container transportation. The company's new goal is to repeat its successful strategy as it diversifies into a range of modern transportation equipment, including the trailers used by trucking companies around the world.

### Strength in the China Market Establishes the Launch-Pad

Most of the emerging dragons begin by establishing a strong position in China. Because the China market is typically fragmented into too many competing firms due to China's system of protectionist provincial governments, pulling ahead of these numerous rivals is no easy task. Those who rise to the top, therefore, have already experienced a baptism of fire. This means they already have well-honed skills in paring down costs and squeezing the maximum benefit from limited resources.

CIMC is no exception. Its first container rolled off the line in 1982, but a combination of inexperienced management and a downturn in the market led the company near disaster; in 1986 production was shut down and most of its employees laid off. CIMC was subsequently restructured, but even by 1990 it was a minor producer, making less than ten thousand containers a year. It found itself competing with more than twenty other container producers that had sprung up across China, attracted by the high margins on a business with low barriers to entry and a breakeven on only a few thousand units.

When Mai Boliang, the current president of CIMC, was appointed in 1991, he set about an aggressive expansion plan that would enable CIMC to pull away from its Chinese competitors. Taking advantage of new regulations that opened the way for initial public offerings (IPOs) in China, he floated the company on the Shenzhen Stock Exchange in 1993 and used

**EPICOR.**



the money to buy up Chinese competitors that were struggling as the demand cycle suffered a downswing. These acquisitions enabled CIMC to expand to five massive plants; by 1996, it was number one in China. Given the huge size of the China market, this already made it one of the largest players in the world—large enough to gain the economies of scale necessary to become cost competitive in manufacturing compared with its established global competitors.

### Finding the Loose Brick

Like most of its Chinese cousins, when CIMC set out to expand its market share abroad it looked for a loose brick in established competitors' defenses. CIMC found a classic loose brick in the combination of standard, low-priced containers and the way its rivals accounted for profits.

As global competition in the container market intensified, prices plummeted; a standard container that had sold for \$2,850 in 1995, for example, netted only \$1,300 by 1999. In consequence margins on sales were squeezed to only 3 percent. CIMC recognized a silver lining in this otherwise dismal picture—its international competitors, mainly in Korea and Japan, must be suffering even more severely.

It was here that CIMC identified a loose brick. It knew that its Asian competitors were almost all part

of diversified conglomerates that regularly reassessed the relative returns on investment across their businesses. CIMC could be almost certain that its rivals' head-office accountants would be telling their bosses that standard containers were unprofitable "dogs" in their portfolio, and it wouldn't take much more pain before these companies exited the market.

CIMC therefore set about stepping up the competitive pressure on the business line it guessed its rivals regarded as the least attractive to defend—a loose brick it had a chance to dislodge. CIMC focused its innovation efforts on an all-out push to remove cost from every activity in its business. By streamlining its processes for procurement of raw materials, benchmarking and rationalizing the activities in each plant, accessing international finance to cut its cost of capital, and looking for more efficient ways to transport containers, it was able to squeeze 33 percent out of material costs and 46 percent out of its manufacturing and overhead costs. More efficient transportation alone saved \$5 million per annum.

These initiatives across the entire range of activities meant that CIMC extended its cost advantage far beyond the differential in wage rates, so that even when competitors began to move their manufacturing to China to take advantage of lower labor costs, they couldn't produce a finished container as cheaply

## Manufacturing Management Focus

as CIMC. As CIMC won orders, its total volume expanded, kick-starting a virtuous cycle in which growing economies of scale continued to reinforce its cost advantage. By 1996 it was churning out 199,000 units—about one in five of every new container manufactured in the world—and became global number one by volume.

### Moving Upmarket

Having secured its scale and cost advantages in the production of standard containers, CIMC's strategy was to use cost innovation to move upmarket and carve out a large share of more sophisticated products.

Its chance to break out of the low end came when the Asian financial crisis hit in 1997. CIMC's diversified rivals, especially the Korean companies, were hard hit and needed to offload noncore businesses. Their unprofitable container operations were high on the list for disposal. The specialized competitors in Germany, meanwhile, were seeing their business dry up because the crisis eliminated their customers' ability to pay premium prices. CIMC took full advantage of this situation.

### High Technology at Low Cost

CIMC began by investing \$50 million in a new subsidiary, the Shanghai CIMC Reefer Containers Co., Ltd, to manufacture reefers. It then entered into a licensing agreement with Graaff Transportsysteme GmbH, a specialist producer of refrigerated containers that had innovative, proprietary, and widely accepted technologies for the manufacture of the insulated panels used in reefers.

CIMC paid Graaff license fees on 12 patents used in the new opera-



***It is clear from these statistics that CIMC's impact on the global container business is not a one-off. Chinese companies across a wide spectrum of industries and heritages have begun their assault on the global market.***

tion. In addition, Graaff received 2 percent equity in the venture and \$750,000 for selling one of their existing production lines, to be dismantled and shipped to China, along with, the services of Stephan Teepe, a recognized German expert in the sector who was appointed chief engineer of the new Shanghai plant.

But CIMC's objective went far beyond imitating an established player. Instead its strategy was to use its lower cost design and engineering resources to improve on the technologies it had acquired as well as to apply them to create a broader product range than its global competitors. In short, cost innovation to deliver technology at low cost and variety at low cost.

CIMC quickly absorbed the German technology and then set about scaling it up and making improvements. According to Teepe: "When the production line was imported from Germany it had a capacity of 10,000 TEUs [twenty-foot equivalent units] per annum. Over the next five years CIMC technicians fundamentally reengineered the manufacturing process four times, applying ad-

vanced technology borrowed from the auto industry." This allowed CIMC to gain a technological edge on its established competitors while still reducing its costs further.

Having brought advanced technology at low cost to the reefer business, CIMC began to drive hard to increase its market share in order to kick-start a new cycle of cost reduction through scale economies and learning. Again taking advantage of the after-shocks of the 1997ian financial crisis, it was able to acquire Hyundai's plant in Qingdao at a bargain price—under \$20 million. Through this deal CIMC gained production facilities with an estimated replacement value of \$180 million, an additional line for producing reefers, and effectively removed a major competitor from the market. CIMC then expanded the capacity of its newly acquired facilities by 150 percent to 25,000 TEUs. But even in the seemingly routine task of expanding an existing plant, CIMC found ways to innovate on cost. While former owner Hyundai had budgeted \$30 million to increase capacity, CIMC leveraged the experience it had gained through the Shanghai plant and used innovative approaches and low-cost engi-





***CIMC then set about its next round of cost innovation: finding a way to replace the expensive aluminum used in refrigerated containers with much cheaper treated steel.***

***It licensed steel-treatment technology from Germany and used its army of engineers to improve performance to the point where treated steel could match the performance of aluminum. CIMC then targeted the customers of the Japanese reefer suppliers who were using aluminum as their raw material—and won the business.***

neers to get the expanded line up and running in less than six months, at just 50 percent of the cost—\$15 million less than what the Korean company had planned!

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The impact of CIMC offering this new low-cost technology and finding a loose brick at which it could be targeted was devastating for CIMC's competitors. One by one the established Japanese players exited the market so that within eight years the last Japanese producer had closed down.

Between 1997 and 2003 CIMC expanded production of refrigerated containers sevenfold to 63,500 TEUs to become the global leader, accounting for 44 percent of the world market.

### **Variety at Low Cost**

Having gained dominance in the reefer segment, CIMC set its sights on extending its product line to include a wide variety of even higher-end products: containers with tanks, folding containers, and other special-purpose models. Over the 1990s the tanker container industry had come to be dominated by South African companies. Led by Consani Engineering, Trencor, and Welfit Oddy, the South Africans controlled close to 50 percent of the world market in 1999. Established since 1928 and winner of several awards for technology excellence and export achievement, Consani alone accounted for 22 percent of world production in 1999.

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In attacking these incumbents, CIMC again deployed the strategy of cost innovation, but this time focused on offering potential customers a wider variety of specialist models at lower cost. It began by signing a technology-transfer agreement with a British container specialist, UBH International Limited (UBHI), owner of an innovative technology (the Universal Beam Tank) that enabled the weight of tank containers to be reduced. At that time, UBHI supplied 1,800 TEUs per annum—almost 15 percent of the global market.

CIMC's second step was to reduce costs below those of the established competitors by driving for scale advantage. Within fifteen months it had built a new plant capable of producing 6,000 TEUs of tank containers per annum—almost three times the size of the incumbent global leader. Having won a large volume of business on the basis of low costs, the next step was to use its competitive Chinese design staff to expand the product line and offer more models and customization services. Key to offering this extra value added while keeping costs down was its innovative redesign of the production line to increase flexibility. CIMC was able to reduce the setup time to change models from twenty minutes to five minutes, allowing it to produce a wider variety of tank containers more cheaply than its competitors.

By 2003, CIMC had captured 30 percent of the world market in the tank container segment. In 2005 it expanded production again to become the world leader in this segment as well. The South African companies that had dominated what they viewed as a safe, high-end niche had been toppled.

### **Retreat to High-End Leads to Defeat**

In our experience, shifting focus to high-end segments is the most common strategy managers in high-cost countries are planning to adopt in response to the new competition from China. But the story of the formerly dominant South African players who found themselves competing with CIMC suggests the need

***It is clear from these statistics that CIMC's impact on the global container business is not a one-off. Chinese companies across a wide spectrum of industries and heritages have begun their assault on the global market.***

## Manufacturing Management Focus

for extreme caution in using this approach. The fact is, their attempt to escape the Chinese challenge by moving to successively higher-end market segments ended in dramatic failure. Tencor ceased production of dry freight containers in 1999 to focus on tanks, but by 2004 it ended manufacture of tank containers as well. Consani was placed into liquidation in January 2005. Meanwhile, UBHI was effectively forced to enter an alliance with CIMC in order to maintain the viability of its “focus on the high-end” strategy.

In 1997, having secured a large share of the volume business, CIMC could afford to establish its own R&D center. CIMC has since consistently invested over 2 percent of its revenues in research, so as its sales volumes and revenues have continued to expand, so has its total R&D budget. In an industry generally populated by medium-sized specialists with limited resources, and aided by the relatively low cost of Chinese engineers, CIMC’s R&D capacity now swamps that of any of its competitors. A powerful new competitive weapon—the ability to back large-scale investigations into new technology—has therefore been added to CIMC’s arsenal.

Paradoxically, therefore, the company that started out as a rock-bottom competitor, relying in cheap labor to win over the basic, volume business in standard containers, now has a greater R&D capability than its volume-starved rivals who tried to move upmarket to escape CIMC’s growing penetration of the low end. CIMC was able to use this new advantage in R&D capability when a shortage of the tropical hardwood used in floors of containers drove the cost of wood up to 15 percent of the total cost of making a container. In the face of declining supply from the world’s rainforests, it could be anticipated that this problem would continue. So as it struggled to procure the half-million cubic feet of hardwood it used every year, CIMC began to focus its R&D capability on finding replacement materials.

Many in the industry believed the problem was intractable. But after many

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rounds of experimentation to get the right combination of functionality, quality consistency, production efficiency, customer acceptance, and cost, CIMC came up with a suitable manmade substitute. Today it has replaced tropical hardwood in 25 percent of its container output and sees the manmade substitute virtually taking over in the future.

CIMC's R&D capabilities have also allowed it to extend the pattern of successive expansion into higher-value segments to the market for foldable containers. The panels that comprise these containers can be folded down in a "chain" onto their bases so that when containers have to be returned empty, they can be collapsed down to 20 percent of their original volume for easy transport. CIMC used its large-scale, low-cost R&D capacity to develop an alternative to the industry standard technology used for the fold-chain mechanism.

Despite being the leading company with 70 percent of the world market in "foldables," Britain's Clive-Smith Cowley got the message: as a medium-sized, specialist company it simply didn't have the resources to win a long-term race against CIMC, even with its initial technological lead. Before CIMC even finalized a prototype, Clive-Smith

Cowley offered to do a deal with its Chinese rival.

Such was CIMC's track record in sweeping through other high-end segments that Clive-Smith Cowley agreed to sell a 60 percent share in its business. This gave CIMC access to the "Domino" chain technology, along with an existing production line that was relocated to Guangdong.

CIMC's rise from struggling entrant into the bottom end of the shipping-container business to unrivalled global leader in virtually every segment of the market—in volume, value, and technical sophistication, and R&D capability—is a wake-up call to those who still believe that moving upmarket ahead of the Chinese is the way to counter disruptive cost innovation from China. Because the Chinese are using their cost advantage across a broad swathe of activities, including R&D, design, and customization, not just in volume manufacturing, moving to successively higher-end segments is just as likely to result in bankruptcy as it is in salvation.

### **Dragons at Your Door**

It is clear from these statistics that CIMC's impact on the global container business is

not a one-off. Chinese companies across a wide spectrum of industries and heritages have begun their assault on the global market.

As the Chinese dragons' relentless pressure to obsolete the conventional wisdom of global business gathers strength, few businesses will be immune. Sooner or later, the emerging dragons will come knocking on the door of your industry, whether you are in low tech or high tech, a mass-market or a specialized niche. The questions every manager needs to be asking, therefore, are:

- How will the dragons disrupt global competition?
- When are they likely to come knocking at my door?
- What should I be doing about it?

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# Distribution and Material Handling Focus

## Logistics News: Should Labor Management always come after WMS?

That's the Prevailing Wisdom, but Some Disagree

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As Labor Management Systems continue to gain in popularity, a frequent question we receive at Supply Chain Digest is: can you or should you put in Labor at the same time as a new WMS?

This question was in fact one of the first ones we received for our New Answers@scdigest feature, and a number of our experts offered their opinions (See [Can You Implement WMS and LMS Together?](#) for full question and expert responses).

The conventional wisdom has generally been that you do Labor after WMS, for a variety of reasons. Those include:

- The need to get new process down pat first
- Too much complexity going on with just WMS implementation to add on more work
- Similarly, with people consumed with the WMS project, not enough available resource to also tack on LMS

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Another factor is that companies often don't want to generate all the potential savings from WMS and LMS in one big bang. Often, it is better to sequence the savings by first doing WMS and then later driving another level of costs out through Labor Management. This approach can drive a "continuous improvement" model in distribution for a number of years through the WMS

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and then LMS implementations and resulting operational improvements.

That was certainly the case for two of the case studies we have done on LMS, as both Sara Lee Foods and Sports Chalet looked to labor to deliver a new round of savings after WMS. (See [Sports Chalet Makes Labor Management Work Through Technology and Performance-Driven Culture](#) and [Sara Lee Foods Finds LMS Value](#).)

### Place for LMS First?

There are some, however, who question that conventional wisdom.

“I would be quick to point out that with today’s LMS solutions you can and should consider implementing the LMS first,” says **John Seidl**, a Principal at Kurt Salmon Associates and its new GoalPost Labor Management group. “The LMS can function well in a legacy or manual environment and will generate the hard savings needed to further justify the WMS. This approach has only become possible in the last 3 or 4 years but in one that every company should consider - a self-funding approach with direct benefits right up front. I would also suggest you consider implementing slotting, supply chain event management and TMS before the WMS as well.”

Those sentiments were supported by **Jeffrey Boudreau**, a partner at XCD Performance Consulting, who told SCDigest that the conventional

*The common theme among both sides of the coin is that LMS can deliver a lot of value to distribution operations. Either approach can and has delivered strong results. We’d suggest distribution managers keep their options open.*

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approach often misses opportunity.

There seems to be pervasive assumptions labor management should be considered only after every possible supply chain improvement has been pursued. It is the “icing on the cake” after network design, automation, and WMS benefits run their course, Boudreau wrote.

“Quite the contrary, I find leading companies use labor management in strategic ways at every possible opportunity: Such as to extend facility output before new capacity comes on line; or as part of a broad distribution network strategy to reduce the number of facilities in a network, their size and capital requirements,” he added.

The common theme among both sides of the coin is that LMS can deliver a lot of value to distribution operations. Either approach can and has delivered strong results. We’d suggest distribution managers keep their options open.

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**Do you agree or disagree? Share your perspective by emailing us a [feedback@scdigest.com](mailto:feedback@scdigest.com)**

### The Issue:

Should a Labor Management System ever be implemented in combination with a new WMS?

### The Thinking:

- Conventional Wisdom has generally said do LMS after WMS, due to process stabilization and resources issues, as well as to phase benefits
- Some question that wisdom, and suggest doing LMS before WMS



# Supply Chain Trends and Issues

## Supply Chain Performance Management: New Metric Framework from APQC

### Focus on Productivity Per FTE is Different; a Good Place to Start for Metrics Development

It is unquestionably the era of Supply Chain Performance Management – companies are using metrics to drive their supply chains as never before, with increasingly sophisticated tools for calculating, viewing and distributing metrics across the organization. Performance Management was one of the top 10 [Supply Chain Megatrends](#) SCDigest identified earlier this year.

There are a number of frameworks for building and improving the metrics programs at your company. The [SCOR Model](#) from the Supply Chain Council was really the first of these frameworks, providing model for understanding supply chain processes and providing corresponding metrics for those processes at multiple levels. [AMR Research](#) has developed a “hierarchy of Supply Chain Metrics,” and many other consulting organizations have built their own models.

[APQC](#), a non-profit organization focused on process and performance improvement, largely through benchmarking services, recently updated



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its metric framework for supply chain processes. The original model and latest revisions were developed with the help of practitioners, academics and consultants.

### Focus on Productivity is Different

APQCs Supply Chain process and metrics model sits within its overall Operations framework, a five-step model:

- Develop Vision and Strategy
- Design and Develop Products and Services
- Market and Sell Products and Services
- **Deliver Products and Services**
- Manage Customer Care

Deliver Products and Services is the primary Supply Chain related component of the overall model.

One thing that sets the APQC model apart is its focus on productivity metrics per full time equivalent (FTE) or dollar spent; for example, "Number of FTEs for the logistics function per \$1 billion revenue," under transportation and warehousing. That theme is carried through most of the supply chain process categories.

Of course, no one model is going to be perfect for specific company, and its easy to get in trouble by taking them to far. For example, focusing on the FTE-related metrics might drive a company to incorrectly outsource some supply chain processes.

The APQC metrics framework is certainly a valuable addition to the existing knowledge base.

The metrics framework by category is detailed below.

## Supply Chain Planning

- Cash-to-cash cycle time
- COGS as a percentage of revenue
- Finished goods inventory turn rate
- Forecast accuracy one planning period prior to production run

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- Number of FTEs for the supply chain planning function per \$1 billion revenue
- Production schedule attainment for a planning period
- Total annual inventory turn rate
- Total expediting costs to execute the production plan

### Procurement and Sourcing

#### Sourcing Strategy:

- Number of FTEs for the process “develop sourcing strategies” per \$1 billion purchases
- Personnel cost (including benefits) of the process “develop sourcing strategies” per \$1,000 purchases
- Total cost of the process “develop sourcing strategies” per \$1,000 purchases

#### Select suppliers and develop/maintain contracts:

- Number of FTEs for the process “select suppliers and develop/maintain contracts” per \$1 billion purchases
- Percentage of annual purchases value from certified vendors
- Personnel cost (including benefits) of the process “select suppliers and develop/maintain contracts” per \$1,000 purchases
- Total cost of the process “select suppliers and develop/maintain contracts” per \$1,000 purchases

#### The Issue:

- Benchmarking organization APQC releases a revised framework for its supply chain metrics model

#### What’s Important:

- As with the SCOR Model from the Supply Chain Council, this is a good place to start to improve your metrics program
- Focus on productivity measures per Full Time Equivalent is a differentiator from other models
- Like any such tool, use it as a base and carefully adapt it to your specific needs

# Supply Chain Trends and Issues

Order materials and services:

- Cycle time in hours to place a purchase order
- Number of FTEs for the process "order materials/services" per \$1 billion purchases
- Number of purchase orders processed per "order materials/services" FTE
- Percentage of purchase orders approved electronically
- Personnel cost (including benefits) of the process "order materials/services" per \$1,000 purchases
- Total cost of the process "order materials/services" per purchase order

Appraise and develop suppliers:

- Number of FTEs for the process "appraise and develop suppliers" per \$1 billion purchases
- Percentage of supplier orders delivered on time
- Personnel cost (including benefits) of the process "appraise and develop suppliers" per \$1,000 purchases
- Total cost of the process "appraise and develop suppliers" per \$1,000 purchases
- Total number of active vendors in the master file per \$1 million purchases

## Produce/Manufacture Product

- Actual production rate as a percentage of the



## APQC's Operations Process Model

- maximum capable production rate
- Annual work-in-process (WIP) inventory turn rate
- Finished product, first pass quality yield
- Labor turnover rate as a percentage of work force
- Manufacturing cycle time in hours
- Percentage of defective parts per million
- Scrap and rework costs as a percent of sales
- Standard customer lead time (order entry to shipment) in days
- Unplanned machine downtime as a percent of scheduled run time
- Warranty costs (repair and replacement) as a percent of sales
- Unplanned machine downtime as a percent of scheduled run time

## Deliver Product Service To Customer

- Annual contact center cost as a percentage of total annual revenue
- Annual products accepted for return as a percentage of total revenue
- Average cycle time in days between physical receipt of returned product to shipping of replacement for end-customer mail-in returns (not in-person returns)
- Obsolescence rate of spare parts and products in inventory
- Percentage of field service and depot repair incidents outsourced
- Percentage of part numbers on backorder
- Percentage of product support incidents (or "cases") opened by the support center that are remotely resolved
- Percentage of repair incidents identified as "no fault found"
- Percentage of support requests that go through a pre-authorization (entitlement) process
- Percentage of total units returned for reasons other than product damage or failure
- Percentage of units returned from both end-customers and retailers/distributors
- Value of contracts sold for extended warranties or other services as a percentage of revenue
- Warranty costs associated with in-warranty field service, maintenance, and depot repair as a percentage of total annual revenue

## Manage Transportation And Warehousing

Define logistics strategy:

- Customer order cycle time in days
- Number of FTEs for the process "define logistics strategy" per \$1 billion revenue
- Personnel cost (including benefits) of the process "define logistics strategy" per \$1,000 revenue
- Total cost of the process "define logistics strategy" per \$1,000 revenue

Plan inbound material flow:

- Number of FTEs for the process "plan inbound material flow" per \$1 billion revenue
- Personnel cost (including benefits) of the process "plan inbound material flow" per \$1,000 revenue
- Return processing cycle time in days
- Total cost of the process "plan inbound material flow" per \$1,000 revenue

Operate warehousing:

- Dock-to-stock cycle time for supplier deliveries, in hours
- Finished goods inventory turn rate
- Number of FTEs for the process "operate warehousing" per \$1 billion revenue

## Supply Chain Trends and Issues

- Order fill rate
- Order line fill rate
- Percentage of sales order line items not fulfilled due to stockouts
- Personnel cost (including benefits) of the process "operate warehousing" per \$1,000 revenue
- Pick-to-ship cycle time for customer orders, in hours
- Rate of annual raw material inventory turns
- Total cost of the process "operate warehousing" per \$1,000 revenue

Operate outbound transportation:

- Number of FTEs for the process "operate outbound transportation" per \$1 billion revenue
- Percentage of full-load trailer/container capacity utilized per shipment
- Percentage of orders expedited
- Personnel cost (including benefits) of the process "operate outbound transportation" per \$1,000 revenue
- Total cost of the process "operate outbound transportation" per \$1,000 revenue

Manage returns; manage reverse logistics:

- Number of FTEs for the process "manage returns" per \$1 billion revenue.
- Percentage of annual sales value that is returned

- Personnel cost (including benefits) of the process "manage returns" per \$1,000 revenue
- Total cost of the process "manage returns" per \$1,000 revenue

The full framework is available from the APQC web site at no charge.

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**Do you agree or disagree? Share your perspective by emailing us a [feedback@scdigest.com](mailto:feedback@scdigest.com)**

## Mexican Truckers in the US: Understanding the Issues

FMSCA Hopes to Quiet Critics with Plans to Track Trucks by Satellite; How We Got Here

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The passions on both sides of the Mexican trucker debate are pretty high, which is interesting because the issue of access to the US for Mexican trucking companies was hardly noticed amid all the other debate over the North American Free Trade Agreement (NAFTA) before its adoption in 1994.

A lot has changed since then, however. In the US, the past few years have seen both increasing concerns about illegal immigrants from Mexico and threats of terrorist activity made more likely by porous borders, especially the Southern one with Mexico. Now, it's not just the Teamsters looking to stop the access (which they fear will depress wages and jobs), but conservative media pundits as well. Others opposed to the plan cite concerns about the maintenance and safety of Mexican fleets.

At the same time, trade between the US and Mexico has increased significantly since NAFTA's

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passage, and the US has seen growing driver shortages among its trucking ranks. Many view Mexican carriers and drivers as an answer to driver shortage and overall carrier capacity issues.

Last week, The Federal Motor Carrier Safety Administration (FMCSA) announced it was going to require

satellite tracking of both Mexican trucks coming into the US and US carriers entering Mexico.

"This will give us the ability to monitor every vehicle from Mexico and ensure all companies are following our strict safety requirements, including those governing hours of service," said FMCSA Administrator John Hill in a statement from the agency. The system would also track the date and time of international and state crossings by Mexican carriers.

The move is another effort to keep the three-week program alive after both houses of Congress voted to pull its funding because of perceived concerns about Mexican trucks and drivers jeopardizing safety on U.S. roads.

### How Did We Get Here?

Below is an overview and partial chronology of the Mexican trucker debate. It was developed in part based on a recent article from the Knowledge@Carey newsletter from Arizona State University.

- On January 1, 1994, after fierce debate and concerns about a "great sucking sound" that would be millions of US jobs headed to Mexico, NAFTA goes into effect
- NAFTA requires unrestricted shipping between North American countries. Trucks from neighbor nations were to be given access to border states by 1995, and region-wide by 2000. The provisions have been in effect for movement between Canada and U.S. trucks, but Mexican trucks have been excluded due to safety and other concerns, despite the NAFTA requirements.



*NAFTA allows trucks from any North American country to deliver and pick up goods within the borders of neighboring nations, but point-to-point shipping on foreign soil is prohibited.*



- Despite its support for NAFTA, The Clinton's administration refused to open U.S. highways to Mexican trucks in 1995. Mexico appealed to a NAFTA arbitration panel, which ruled in 2001 that the United States must allow Mexican trucks to enter. The United States has not complied. Critics say the U.S. stance undermines NAFTA and discourages other nations from honoring trade agreements.
- Finally, in February, 2007, the countries came to an agreement that would allow 100 Mexican and US trucking companies basically unlimited access to make point-to-point deliveries in each country.
- In mid-September, the program began, with a Mexican carrier entering the US, and a few days later an American carrier transporting into Mexico.
- A few days later, the US Senate passes a bill that would ban the Mexican trucking program. But a similar bill would have to pass the House and be signed by President Bush to become law. While it can not overturn NAFTA treaty provisions, it is designed to have the same effect by prohibiting the Transportation Department from spending money on the pilot program
- NAFTA allows trucks from any North American country to deliver and pick up goods within the borders of neighboring nations, but point-to-point shipping on foreign soil is prohibited. For example, a Mexican truck can deliver a shipment from Mexico within the United States and return with goods to sell in Mexico, but it cannot pick up and then deliver shipments within the United States. The same rules apply for U.S. and Canadian vehicles.



## Transportation Management Focus

- Currently, Mexican trucks are required to drop off U.S.-bound shipments within the immediate border zone. This is generally 25 miles from the international border, although the area is larger in Arizona. Likewise, U.S. trucks must drop off shipments in Mexico shortly after crossing the border.
- Since trucking firms don't want expensive, long-haul tractor trailers idling on the border, cartage companies often pick up shipments and drop them off on the other side of the border, for a fee. Cartage vehicles are generally older, and may emit more pollutants, causing environmental problems.
- The busiest point of entry on the southern border is in Laredo, Texas, where the lion's share of U.S.-bound trucks pass. Most produce from Mexico enters the United States via Nogales, Arizona, causing seasonal fluctuations in border traffic that have led to lengthy delays. Other major entry points are El Paso, Texas and San Diego, California. ■

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## Import Warehouses – The Next Bottleneck in Global Supply Chains?

As Port Congestion Eases for Now, Other Factors are Complicating the Transloading and Distribution Process

At one level, global logistics managers have been able to relax a bit in 2007, as congestion at US ports has been substantially reduced from the levels faced by importers in previous years (See **Port Congestion Worries Fade, as Container Volume Growth Slows Dramatically**).

But a variety of factors are causing throughput challenges in many “import warehouses” – facilities used to process and transfer inventory coming in from offshore supply sources. For example, the “mega” cargo ships increasingly being used to move goods from Asia have altered the incoming container profile for many importers – they now receive fewer shipments of more containers, playing havoc with labor requirements and workload balancing. With ships continuing to get larger and congestion likely to worsen again, these problems are not likely to disappear any time soon.

High prices and lack of availability of land is also

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pushing import warehouse further and further from port facilities, especially in the Long Beach/LA port complex. Combined with heavy traffic congestion, the ability of importers to quickly get containers from terminals to the warehouses for processing is often constrained.

### Different Import Warehouse Models

Import warehouses serve several different purposes in an increasingly complex global supply chain process.



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- **Transloading:** Moving goods from ocean container to truck trailers for inland transport by truck or rail/intermodal.
- **Distribution:** Sorting and fulfillment services for customer or retail store orders
- **Warehousing:** Goods are stored for longer periods in the import warehouse, especially those located in "Foreign Trade Zones"
- **Postonement:** Additional services and "value-add" are performed in the warehouse before distribution. Those services can range from simple (price ticketing) to complex (final assembly of electronic products) and be performed defensively (suppliers can't perform the services required) or offensively (delaying final inventory decisions).

A given import warehouse can be involved in one or several of these functions. Many companies use third parties to manage their import warehouse, while others, especially in the retail sector, run their own operations.

The need for import warehouse has naturally grown in direct proportion to the double digit annual growth in import volumes in the US over the past decade. But as researchers **Arnold Maltz**, Professor of Supply Chain Management at Arizona State University, and **Thomas Speh**, Professor of Distribution at Miami University (Ohio), well captured in a recent report commissioned by [ProLogis](#), the pressures on import warehouses operations are increasing.

***"Import warehouse managers are not masters of their own fates. Rather, their efficiency and productivity depend not just on how well they execute their own operations, but also on how well the other players within the import***



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The most important of these operational challenges are as follows:

- Variable and unbalanced work load requirements due to ocean carriers schedules and long unloading times
- Poor visibility to inbound movements due to manual systems and lack of integrated visibility portals
- Limited flow of containers due to union rules and hours of port/terminal operations

As a result, import warehouse managers often have a very tough job, and operational challenges are an increasing bottleneck for many importers, adding to supply chain variability. As the report notes, "Import warehouse managers are not masters of their own fates. Rather, their efficiency and productivity depend not just on how well they execute their own operations, but also on how well the other players within the import supply chain — the steamship lines, longshoremen, freight forwarders and customs brokers, and the Customs and Border Patrol personnel — execute theirs."

## Glossary of Inbound Global Logistics Terms

**Demurrage:** a penalty fee assessed when containers or other cargo are not moved off a wharf before the free-time allowance expires.

**Drayage:** short haul truck transport from wharf to rail yard, drop yard, or import warehouse.

**Drop yard:** temporary "parking lots" for containers or cargo, located off the wharves and sometimes next to rail yards or import warehouses.

**Floor loading:** containerized freight is usually not palletized. Instead, the bottom layer of boxes is loaded onto the floor of the container. As a result, more boxes can be loaded into a container, but the containers take much longer to unload.

**Inbond:** refers to imported product that has been unloaded from the ship but still owes customs fees and tariffs and thus has not yet cleared for entry.

**Landbridge:** railway transport of ocean containers from wharves to inland ports, where the containers are then unloaded.

**Stevedores:** labor management companies that provide equipment and hire workers to transfer containers and cargo between ships and docks.

**Transload:** operations where inbound ocean containers (or other cargo) are unloaded, palletized, and then reloaded (typically into 53-foot over-the-road trailers), for railway or road transport to a final destination.

## How Can Import Warehousing Supply Chain Flows be Improved

Maltz and Speh offer a number of recommendations on how import warehouses throughput and effectiveness can be improved, based on interviews and observations with nearly two dozen importers and import warehouse operators.

Organized by category, these include:

### Shipping Arrival and Unloading

- Better availability of real-time availability of information on the end-to-end status of ship and container arrival, unloading, customs clearance and drayage pick-up
- Container pick-up hours (now limited) aligned with ship unloading hours (usually round the clock)

### Drayage Operations

- Automated security for entrance and exit
- Real-time monitoring of dwell times
- Centralizing the port chassis pool
- 24-hour delivery availability at the receiving warehouse and/or drop yards

### Warehouse Operations

- Located to minimize inbound/outbound traffic congestion, either near port, near outbound transport, or

on dedicated rights of way

- Access to a single reliable source of complete, accurate information
- Access to a pool of temporary labor to better deal with highly variable volumes
- Physical buildings optimally configured to support the mission (transloading, distribution, distribution and storage, etc.)

### Outbound Transportations

- On dock doublestack rail capability
- Adequate, timely truck capacity

Of these recommendations, relatively few are in the importer's direct control. More flexible port operations are in the hands of the port authorities and their negotiations with the Longshoremen's unions. The Pier Pass program at LA/Long Beach, which allows for 24 hour pick-up during the work week and on Saturday, has generally been considered a success. The concept needs to be expanded elsewhere.

As for improved visibility – that's the holy grail. While there is constant progress, the answer to that still looks to be a long haul.■

**Do you agree or disagree? Share your perspective by emailing us a [feedback@scdigest.com](mailto:feedback@scdigest.com)**

## RFID Compliance in Retail Supply Chain Follows Bar Code Trajectory of 15 Years Ago

### Hugely Optimistic Projections almost Always Fail to Materialize; Steady rather than Exponential Adoption is the Rule

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The world's largest mass merchandiser announces a new program that requires unique identification of pallets and cartons entering its distribution system. Thousands of vendors are expected to comply with new mandates over a period of a few years. The initiative is expected to revolutionize the retailer's supply chain, and dramatically improve supply chain visibility and the flow of goods while reducing supply chain costs and out-of-stocks at the shelf.

Wal-Mart's RFID initiative over the past three years? No, it's Kmart's bar code compliance program of the early 1990s.

#### **Déjà vu All Over Again**

The parallels between today's RFID market in retail and the bar code compliance movement in the early 1990s are remarkable, and hold lessons worth considering in the present day.

Many don't remember that it was not Wal-Mart



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but Kmart, then the largest mass merchandiser in the US, which led the bar code compliance movement of the early 1990s. There were actually two forms of bar code compliance at the time: UPC item labeling, which all told went relatively smoothly, and UCC-128 labeling, which was more difficult and offers a much closer parallel to today's RFID movement.

UCC-128 labeling was part of the "Quick Response" industry initiative that in the early 1990s involved marking pallets and cartons from consumer goods companies with a unique bar code serial number (a special Code 128 format developed by the Uniform Code Council, stewards of the UPC code and partner in today's EPC Global RFID standards group). Usually, these requirements bar code pallet and carton labeling was also tied to mandates for Ad-

vance Ship Notices (ASNs) to be sent via EDI – a new technology at the time.

Kmart pushed the program aggressively, telling thousands of vendors they would be forced to comply with the new bar code and EDI requirements, often within months. Seeing a potential gold rush, many vendors quickly emerged, offering “Compliance Labeling Systems” that for a modest investment would enable consumer goods companies to meet the new retail requirements.

Roughly in parallel with Kmart, a number of other retailers joined in with similar requirements. That includes Target, major department store chains (now all merged with one another, it seems), and Sears, now combined with Kmart. Interestingly, and misunderstood by many, Wal-Mart sat on the sidelines for all of this. To this day, it has not required UCC-128 carton labeling from its vendors.

### **What Actually Happened**

Kmart, which had the largest vendor base by far of those retailers mandating bar code compliance, had tremendous trouble getting the program off the ground,

The big issues: consumer goods manufacturers complained that there wasn't enough (if anything) in it for them, and the technical challenges turned out to be much greater than anyone expected.

Sound familiar?

In fact, years after the Kmart mandates, thousands of its vendors had never complied.

*The big issues: consumer goods manufacturers complained that there wasn't enough (if anything) in it for them, and the technical challenges turned out to be much greater than anyone expected.*

*Sound familiar?*



Ultimately, however, many retailers did receive many benefits from Quick Response and UCC-128 carton labeling, but it took many years. In that sense, the four years that have passed between Wal-Mart's 2003 announcement of a partial mandate for its largest suppliers to beginning tagging cartons with EPC/RFID tags, and the modest progress that has been achieved by this point in 2007, shouldn't seem unusual at all. In fact, Wal-Mart has actually invested more in its own supporting systems for RFID in DCs and stores than most retailers in the 1990s did in support of Quick Response. Back in the 1990s, many consumer goods manufacturers were surprised and sometimes angered to visit Kmart distribution centers at the time and find that the UCC-128 labels they were fined substantially for if missing or incorrect were simply not being used as part of the receiving process.

The "gold rush" for vendors offering UCC-128 compliance system also didn't materialize. A few had a brief run at success, but the expected number of customer sales, which most expected to be in the thousands, just never happened. Companies delayed adoption, found home grown ways to achieve compliance, used third-parties, or otherwise identified ways to avoid making an investment they didn't see paying off in the short term.

Indeed, it wasn't until bar coding and data collection solutions became common in distribution processes as a whole, and embedded in Warehouse Management Systems, that consumer goods vendor support for UCC-128 labeling and ASNs gained critical mass.

<b>From:</b> Best Vendor 1234 Main St. Cincinnati, OH 45240	<b>To:</b> Macy's East c/o Secaucus Federated Logistics DC 500 Meadowlands Parkway Secaucus, NJ 07094
Ship to postal code (420) 07094 	<b>CARRIER:</b> BEST CARRIER <b>B/L NUMBER:</b> 12341234123
<b>PO: 1234567</b> <b>DEPT: 354</b> <b>FOB: FRAGANCES</b>	
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UCC-128 Carton Label

That took time, and says that rather than moving RFID adoption in logistics process from Wal-Mart compliance back into the DC, as many expected or hyped, RFID tagging for retail will take off when consumer goods manufacturers can use EPC tags for their own benefit in the DC, at which point Wal-Mart compliance comes for nearly free. ■

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**Do you agree or disagree? Share your perspective by emailing us a [feedback@scdigest.com](mailto:feedback@scdigest.com)**

### The Issue:

- While many see the current RFID program at Wal-Mart, and the consumer goods to retail generally, as evolving very slowly, the pattern is in fact very similar to the path for mandates by retailers requiring serialized carton labeling in the 1990's.

### The Key Points:

- RFID in retail will simply take a long time.
- Mandates rarely really drive adoption when there aren't benefits to suppliers. RFID will gain critical mass from the supply chain out, not compliance in.

## ECA's: The Preferred Solution Until e-Contract Law Is Better Defined

### In Rush to Achieve the Benefits of e-Procurement, don't Leave Yourself Vulnerable to Legal Risks or Supplier Challenges

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While the modern electronic environment is enabling significant gains in efficiency and productivity in procurement, it also introduces potential legal issues and challenges to sourcing professionals. While such challenges are many and varied, the more significant and pervasive ones relate to contract formation, establishment of contract terms and conditions, and contract administration. Failure to properly address these issues leaves the company open to gaps in what it thought was a clear agreement with a supplier.

"With so much hype and commercial preoccupation, you really need to be conversant with the electronic sourcing legal environment," said Ernest G. Gabbard, Director of Strategic Sourcing & E-Procurement at Allegheny Technologies at an Institute for Supply Management (ISM) conference.

Most sourcing professionals are aware that the Uniform Commercial Code (UCC) requires a written, signed document to establish a "contract." This UCC requirement is not satisfied with many modern electronic transmissions that might be intended to form a contract.

The requirements for a tangible "writing" and/or

"signature" to form a contract have been partially addressed with UCC revisions and with both state and federal legislation, such as the Uniform Electronic Transactions Act. There are also now a slew of vendors providing "e-signature" services.

But there are still risks compared to traditional contracting approaches.

### Consider Establishing an Electronic Commerce Agreement

Until the laws governing e-commerce are well settled, sourcing managers should consider establishing an Electronic Commerce Agreement (ECA) with their more significant suppliers (a sample copy is available here: **Example Electronic Commerce Agreement**). The ECA pre-establishes agreement of both parties to create a contract without a physical writing or signature for each transaction.

It's also important to remember that that UCC and state commercial code requirements are generally not applicable to services. Therefore, an electronic

contract may be binding to a services transaction even though it might not be enforceable for a commodity purchase.

It's smart for sourcing managers to utilize an ECA even for services contracting as well.

## Elements to Consider before Creating the ECA

There are a number of areas that must be included when developing the ECA. For example:

- **Contract terms and conditions:** It's critical to achieve clarity on such important items as warranty, liability, and other terms. An ECA can be utilized to establish agreement in advance on what T&C will govern the electronic transactions. This requirement is covered in section 3 of the sample ECA.
- **Contract administration:** Presuming an enforceable contract exists with the desired T&C, other issues to be addressed include:
  - **e-mail:** Contracts can be established through written correspondence between parties, therefore be continuously aware that your e-mails could contain the elements of a contract.

"Don't let the informal nature of these communications lead us to be less than cautious about the contents and inadvertently create a contract," Gabbard cautioned.

Additionally, if the law requires a tangible "writing," an electronic medium may not satisfy the tangibility requirement. Therefore, if you are intending to create binding legal obligations with such correspondence, you may need to print and sign hard copies to ensure enforceability.



***An Electronic Commerce Agreement Template, Developed by Ernest G. Gabbard, Director of Strategic Sourcing & E-Procurement at Allegheny Technologies, is available [here](#).***

### The Issue:

- Contracting law has still not caught up with the rapidly changing world of e-procurement.

### Recommendations:

- Insist on line-item detail to see if standard vendor pricing models are not appropriate for a specific modification
- Negotiate rights to the control source code at contract time to have another option, which provides negotiating leverage

- **Record retention:** Many local, state and federal laws require that certain records be constructed and maintained in a tangible form. Therefore, electronic records may not satisfy such legal requirements.

These requirements may necessitate that hard copy records be retained until electronic records are universally and uniformly recognized by local, state, and federal laws. Another aspect of this issue is the prospect of retaining electronic files for too long.

Indiscriminate long-term retention not only requires electronic storage capacity, but your organization could be required to produce all such records in the event of a lawsuit. Sourcing managers should consult with legal counsel to establish specific policies, procedures and guidelines for the creation and retention of records in electronic form.

- **Other legal issues:** The new laws may enable parties to increase efficiency and to establish contracts with electronic exchanges, but they also create separate, but related legal issues that will ultimately need to be addressed:
  - **Security:** To ensure that electronic exchanges cannot be altered or counterfeited, electronic encryption technology will likely be required to provide needed protection.
  - **Signature authentication:** Since e-mail or electronic documents do not inherently provide a 'signature' which ensures that the sender intended to 'sign' the transmission and be bound by the communication, encryption technology will be needed to electronically 'sign' or authenticate such transmissions.
  - **Confidentiality:** Standard e-mail is subject to being intercepted electronically, creating confidentiality and privacy issues for sensitive communications. While the technology continues

## Sourcing and Procurement Focus

to improve in this area, prudent business practices may necessitate corporate utilization of conventional communications, such as courier services for extra-sensitive matters.

As companies widely embrace the opportunities for e-procurement, it's critical to not let the convenience and cost savings obscure the need for solid contracting processes.

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