Special Edition / December 2010-January 2011

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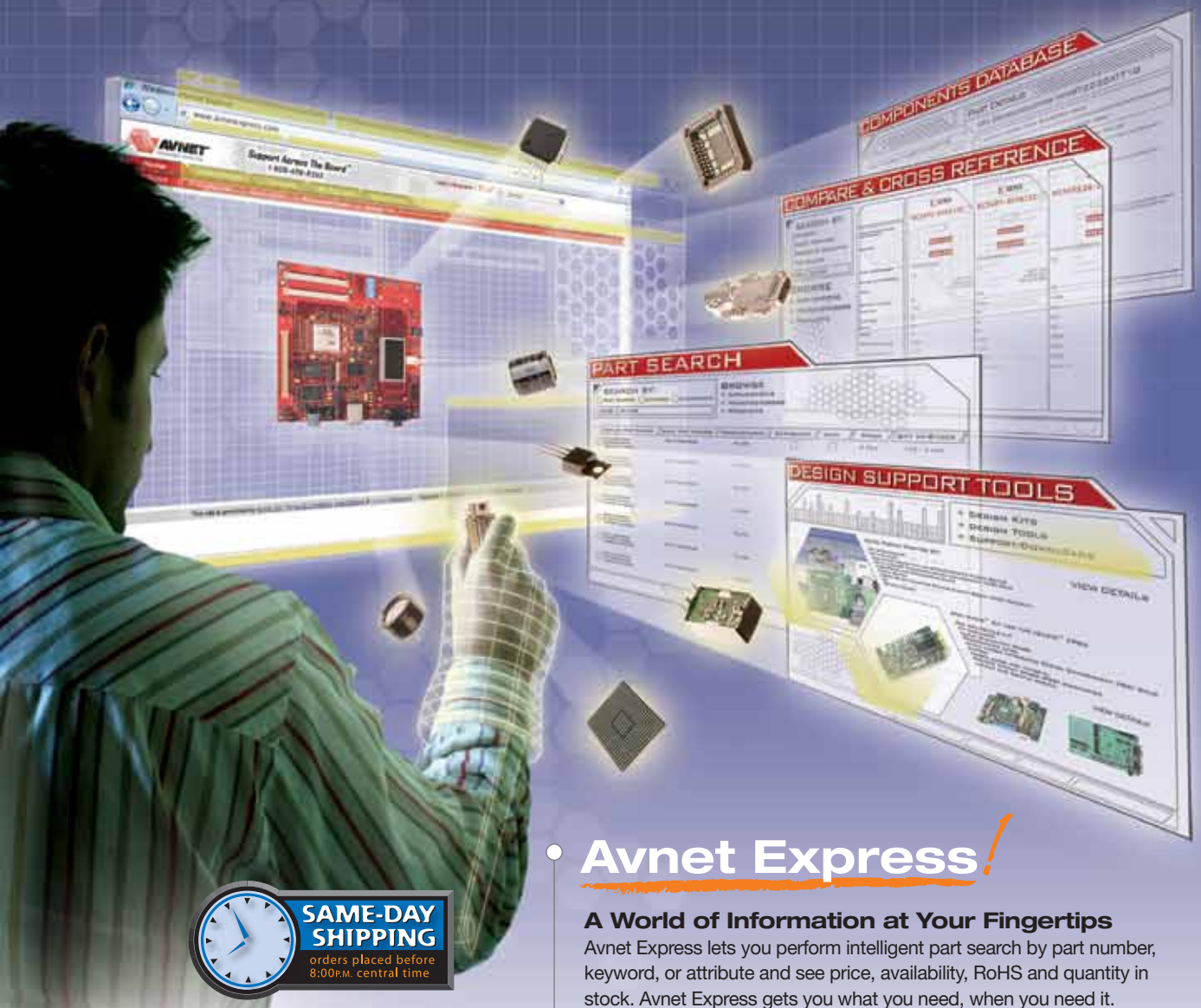

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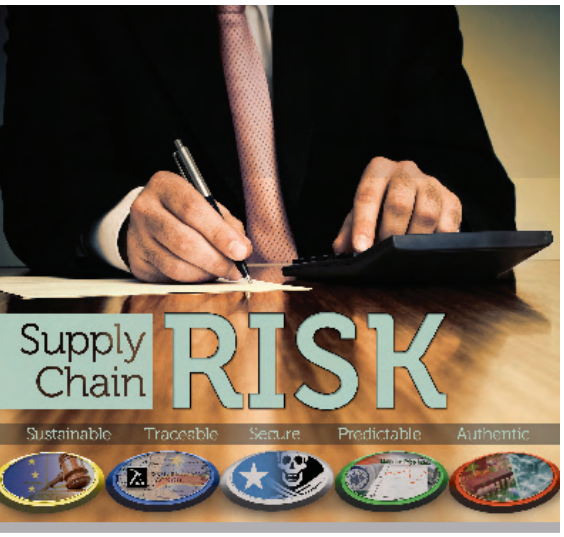

On The Cover - **The threats to supply chain continuity, to revenues and market share, and to brand and corporate reputation are only growing in number, complexity and severity. Supply chain leaders must take action today.**

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Features

The Spectrum of Risk

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The Supply Chain Risk Leadership Council (SCRLC) defines supply chain risk management as: "The practice of managing the risk of any factor or event that can materially disrupt a supply chain whether within a single company or spread across multiple companies." The council adds, "The ultimate purpose of supply chain risk management is to enable cost avoidance, customer service and market position."

Unfortunately, 2010 offered stark examples of "any factor or event": Iceland's Eyjafjallajökull volcano; the Gulf of Mexico oil rig disaster; and the parcel bomb plot involving air cargo destined for the US. Add to that: volatile demand, vulnerable suppliers, a fragile recovery, expanding regulations, gridlock in Washington and an uncertain outlook for 2011 – in short, plenty of potential for "material disruption."

With this unstable environment as the backdrop, this Special Edition of *Supply & Demand Chain Executive* looks at several different aspects of risk that have direct relevance for the supply chain today. The magazine's staff has produced this issue in conjunction with IHS, a leading provider of critical information and insight well known for its expertise and thought-leadership around the product lifecycle, environmental, security and energy domains, including as they relate to the supply chain.

The article "Components of Risk," starting on pg. 8, looks at the volatility that has hit the electronics value chain since the start of the Great Recession in 2007. Experts from industry analyst firm iSuppli and from IHS address the causes and implications of the V-shaped recovery in the industry, and the article addresses the need for a "real-time" strategy for managing the risks inherent in product lifecycles.

In "Get off the Commodity Rollercoaster" (pg. 10), we look at the ups and downs of commodity prices during, and in the wake of, the latest "super cycle." John Mothersole, an expert on the nonferrous metals market with IHS Global Insight, offers a strategic approach to managing commodity price intelligence, and he lays out steps that companies can take to begin mitigating the impact of commodity price volatility.

The article "Conflict Minerals: A Supply Chain Perspective" (pg. 18) gives a primer on the conflict minerals issue and the potential for supply disruptions as a result of new regulations due to go into effect in 2011. Scott Wilson, an IHS expert who works on issues of supply chain risk mitigation around material supply, addresses the preparedness of the supply chain for the impact of the new regulations. The article highlights the need for a proactive strategy based on product information management, risk mitigation and supply chain optimization. And a companion piece, "Lessons Learned from the Congo" (pg. 14), offers best practices in sustainability and environmental compliance to be gleaned from the conflict minerals issue.

We look at emerging technologies that are driving a new generation of global supply chain visibility in the article "The Supply Chain Goes Mobile @ IHS" (pg. 26). The article describes a new marriage of enabling technologies like GPS, "augmented reality" and geospatial information systems that are helping to improve visibility to assets in motion throughout the supply chain. To that end, Ron Crean, a maritime industry veteran with IHS Fairplay, puts forward a vision for advancing global location intelligence strategies.

A common theme in these and the other articles in this Special Edition is that leading companies cannot afford to wait. The threats to supply chain continuity, to revenues and market share, and to brand and corporate reputation are only growing in number, complexity and severity. It therefore is imperative that supply chain leaders proactively define the threats to their value chains, frame the risks to the enterprise for senior management, and drive initiatives that mitigate the risks before they occur. Dianne Feinstein, the California senator, said, "Ninety percent of leadership is the ability to communicate something people want." It's up to supply chain leaders to start that communication today.

How are you mitigating the primary risks to your supply chain? Write me at areese@sdcexec.com to share your thoughts. I'll look forward to hearing from you. ■

Catching up with a Pro

Risk Mitigation is Critical to Success in 2011

According to Don Lesem of IHS, volatility threatens everything from chemicals and trace minerals used in electronics to commodity prices and global trade flows in 2011.

By Andrew K. Reese

Don Lesem, Vice President, Product Lifecycle Global Products and Services, IHS, Inc.

It's that time of year when, in addition to making (and breaking) New Year resolutions, we can't resist the urge to get caught up in "Top Predictions for 2011" from pundits and industry experts. In addition to being drawn into such musings, I often find myself digging up past editions of the magazine where we have asked our Pros to Know and Green Supply Chain Award winners to provide similar prognostications based on key supply chain disciplines in which they have expert insight.

I recently caught up with one such Pro to Know, Don Lesem, IHS Vice President, Product Lifecycle Global Products and Services. Don has purview over certain Supply Chain and Design capabilities at IHS, which includes the company's strong portfolio of electronics value chain solutions, such as the highly regarded technology research and advisory services that the company offers through its November 19, 2010, acquisition of iSuppli.

For our 2009 Pro to Know predictions, Lesem et al had this to offer the magazine:

"Insight into material substances used in products and processes is vital. A critical inflection point in manufacturing history was overshadowed by economic woes: An abrupt shift from traditional supply to regulated, "green" chemicals and materials. Inventory is dangerously lean. When demand improves, it will be met with skepticism and conservative production. Companies must secure traditional supply, while competing for new eco-friendly materials. Winners will be those who avoid supply interruption, breeze over regulatory hurdles, and make the green transition before their peers."

As covered in the article "Risk in the Electronics Value Chain" (page 8), these predictions came true as 2010 witnessed major part shortages and constraints. Deeper, more quantitative validation from IHS shows the relationship with these shortages to economic recession and "green" environmental compliance. In speaking with Don, I reflected on these predictions and looked ahead to 2011.

AR: Don, as 2010 unfolded in the electronics value chain, it turned out you offered great advice. In retrospect, besides your obvious experience and understanding of the markets you serve, what more specifically did you base this 2010 prediction upon that ultimately resulted in it being quite accurate?

DL: Simply put, the assessment I made of the electronics value chain came from anecdotal and first-hand experience from IHS customers and colleagues worldwide. I also drew upon our own electronic component insight from IHS products and services, which validated my hypothesis.

It was apparent to our electronic component trend analyses that manufacturers upstream were in a severe reaction mode due to shortfall in demand and the economic downward spiral. When applied to dangerously lean inventory throughout a predominantly global, multi-tier electronics value chain, this suggested that a major divide would widen between those unprepared downstream entities severely impacted by shortages and those more prepared to use agility to their business advantage. In a sense, to the prepared, it wasn't a prediction, but a fact-based assessment of where the market was heading.

AR: Is the market still headed this way? Are manufacturers still in reaction mode?

DL: Yes and no. Obviously the economic climate has changed. We still see a significant number of cuts being

made to product lines, and the primary reason specified by manufacturers is still related to demand. To that end, they're still making moves to rationalize product lines or trim low performers. However, we can also see a shift from frontline product-focused behavior to facility closures and consolidation. This, combined with increases in fab utilization, can suggest the reactionary moment has subsided and we're seeing the trailing effects of closing that chapter in the economic recession in favor of a newer, healthier one.

AR: And what about the environmental compliance and regulatory angle? Is this behavior across the supply chain the same?

DL: This is another "yes and no" answer. Yes, we still see sustainability and environmental compliance issues causing unexpected volatility to otherwise stable, albeit variable supply and demand patterns. But no, it's not the same set of sustainability and compliance pressures. We continue to see material shortages, price increases, obsolete parts caused by RoHS, while the effects of EU REACH and its Substances of Very High (SVHC) like DEHP have materialized. Meanwhile, there's a whole host of new issues imposing change upon the supply chain.

AR: What other key issues do you see driving behavior in 2011?

DL: Two come to mind immediately. The first occurred when the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 was signed into law on July 21, 2010. It contains a six-page section formalizing plans to regulate the otherwise social issue of "conflict minerals" coming into the supply chain from the Democratic Republic of the Congo (DRC). The second is Kaiser Permanente's October 28, 2010, research announcement concluding, "Exposure to BPA Associated with Reduced Semen Quality." Albeit the topic of BPA is still of much debate, this may be the definitive game-changing development to move the needle on regulating BPA, causing a much broader industry move from today's more isolated and voluntary approaches — things like baby bottles being BPA-free.

AR: Our readers have been extremely interested in our conflict minerals coverage [surrounding trade exploitation and human atrocities linked to minerals like tin, gold, tantalum, and tungsten sourced from the DRC]. IHS has stood out for not only immediately discussing this issue with our publication but also leading dialog and research within industry on this critical supply chain issue. So, first things first, why IHS? Meaning, what prompted IHS to so quickly react to this kind of development?

DL: That's easy: our customers. IHS has very publicly committed to delivering "customer delight" as one of our four measurable company goals. Every colleague at IHS is now measured on our ability to delight our customers. More specifically, our customers brought this DRC issue to our attention as a top concern, and we brought it to your readers. It's as simple as that.

AR: But why such focus coming from your global supply chain and design capabilities organization?

DL: This new regulation governs not only what materials go into products but also evidence of where minerals originate and the chain of custody as they pass through the supply chain. It adds some very unique capability requirements upon the supply chain. What's not unique, and is similar to environmental regulations like RoHS and REACH, is that there's a strong chance that formalizing concerns under this US legislation can force a similar "cause-and-effect" impact on supply and demand characteristics. We may see rising prices of metals as a result of US or other global companies banning the use of minerals derived from this region as well as supply constraints resulting from manufacturers choosing to limit, or abandon altogether, products and processes using these materials. In all, besides potential disruptions from material shortages caused by production, margin, and allocation issues, it's plausible that rising lead times will incent electronic counterfeiters to prey upon companies competing for a diminishing pool of to-be-obsolete or constrained parts.

AR: So, what does the average reader do to take this 30,000-foot view and turn it into some tangible steps for enabling solutions and how these may lower their risk exposure?

DL: Specific to electronics value chains, in order to sense and respond to challenging market pressures, companies can utilize technology value chain research and advisory services, BOM and Lifecycle Management toolsets, and in-depth information on counterfeit, substandard and high-risk parts. To sum it all up, an increase in obsolescence as indicated by rising EOL notices as a KPI for material shortages eventual result show up as price and lead-time increases, of which rising lead-time itself is a KPI for increased counterfeit part activity. Meanwhile, across industries, insight into ocean routes and trade flows, commodity outlooks, and pricing indices can provide companies with macro-level, early warning signals to mitigate risk. These are all key things to keep a close eye on and IHS can obviously help our clients address each of them.

AR: So market turbulence and the subsequent need to mitigate supply chain risk is your prognostication for 2011?

DL: Yes, unless I can quit while I'm ahead? ■

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Risk in the Electronics Value Chain

A V-shaped recovery has companies scrambling and in need of strategies to manage everything from market demand and price volatility to material shortages and counterfeit parts

By Editorial Staff

The Great Recession of 2007-2009 produced an unprecedented impact on the electronics value chain. The sharp drop-off in demand drove weaker components suppliers out of business and hit the bottom lines – and staffing levels – at even the strongest industry suppliers and OEMs. Then the Great Recovery created new havoc as supply constraints on a broad range of components sent OEMs scrambling to meet newly resurgent demand.

This economic instability has compounded the intrinsic imbalance and variability already present in the electronics supply chain and its infamous bullwhip effect, spurred, for example, by technology innovation. To complicate matters, the influence of turbulent markets upon value chains has been exacerbated by the effects of sustainability and related environmental regulations that have imposed obligatory change to otherwise natural supply and demand patterns around critical chemical and materials.

Together, the problematic gyrations from economic duress and regulatory compliance have demonstrated the critical need for predictive analytics to manage component obsolescence, as well as their inherent limitations. Volatility imposed by these forces necessitates equally robust, near "real-time" capabilities to respond to unforeseen supplier and component issues, while also pointing to the need for companies to get a better handle on tracking component applications and conditions of the markets they serve. Manufacturers across sectors should consider adopting information and insight strategies that strengthen proactive and reactive competencies from long-term strategic planning down to operational daily execution. By doing so, they can upgrade to tools needed to perform adequately in today's global marketplace, while mitigating growing threats from the likes of counterfeit components that pose considerable risk to brand, customer satisfaction and shareholder value.

Riding the Wave Down

The fall and rise of the semiconductor industry over the past three years are representative of the recession's profound impact on the electronics sector. The semiconductor industry, notoriously cyclical, is tied closely to the health of the overall global economy. But the impact of the past 36 months has been unparalleled in the history of the sector, according to Rick Pierson, senior analyst for semiconductors at the well-known industry analyst firm iSuppli and head of the Component Price Tracking (CPT) Service at the firm. "This was the most significant recession that the semiconductor industry has seen," Pierson notes "A lot of suppliers 'went dark' and actually laid off skilled workers on the front end in the fabs. They were just trying to keep the lights on."

The impact of the recession on semiconductor companies can be seen in the global bookings of North American-headquartered semiconductor equipment producers, as reported by SEMI, the global industry association serving the manufacturing supply chains for the microelectronic, display and photovoltaic industries. While the industry entered 2008 with a three-month average of billings above the $1 billion mark, by December 2008 the industry was reporting billings of $579 million. January 2009 saw a further astonishing drop to $277 million, a 75 percent fall-off compared to January 2008. The market bottomed out at $246 million two months later. Other industry sources point to fab utilization within the semiconductor industry, which fell from close to 90 percent in the third quarter of 2008 to just over 30 percent in Q1/2009.

The impact on the broader electronics value chain can be seen in the influx of product end-of-life (EOL) notices issued by component manufacturers in the sector, as tracked by IHS Inc., a leading provider of supply chain information and insight. IHS captures data on product lifecycle events for components across the sector, recording manufacturer-issued alerts regarding new product introduction, product change notification or product end-of-life. IHS records the manufacturer's individual reasons for each event as well as the impacted manufacturer parts, noting whether the lifecycle event is driven by demand-side economics (e.g., a drop-off in sales of the component), environmental compliance or sustainability (e.g., EU RoHS or REACH transitions), technology considerations (e.g., obsolete or new technology), organizational reasons (e.g., M&A, product rationalization), or supply-side economics (e.g., constraints on supply).

IHS insight-tracking EOL notices show that in the three months following Lehman Brothers' filing for Chapter 11 bankruptcy protection on September 15, 2008 – regarded as the spark that set off the financial sector implosion, broadening and deepening the recession – manufacturer end-of-life notices increased nearly 300 percent. This economic reaction from manufacturers spilled over into 2009, where continued weakness brought about a tsunami of end-of-life notices, with the number of EOLs increasing in the neighborhood of 1,000 percent. Overall, IHS data show that demand-side factors behind end-of-life notices averaged 17 percent of total EOLs from 2004 through 2008 but surged to 90 percent in 2009 as the drop-off in demand engendered by the recession rippled through the electronics supply chain.

> **"Suppliers were just not prepared for the recovery. Consequently, what we have now is a constrained environment since the first quarter of 2010."**
>
> — Rick Pierson, senior analyst for semiconductors, iSuppli

The Age of Constraint

And then, almost as quickly as the recession began in the electronics value chain, it came to an abrupt end. "When the recovery started, it was very dramatic," says iSuppli's Pierson. He explains that the semiconductor industry reacted rapidly to the downturn by constricting capacity; larger companies in the sector shut down lines, while smaller players shut their facilities permanently, oftentimes to be bought out by forward-thinking (and cash-rich) majors that were looking to grab market share when the (inevitable) uptick occurred.

Demand in the industry, based on the SEMI-reported billings in the semiconductor industry, had been picking up steadily since bottoming out in March 2009 and ticked up above the $1 billion mark again in January 2010, but resurgent demand for components in the electronics supply chain created new problems, according to Pierson. Suppliers that had laid off skilled workers and closed down capacity found they were unable to bring capacity back online fast enough to meet orders. "Suppliers were just not prepared for the recovery, and there was this insatiable demand for these commodity-type components. Consequently, what we have now is a constrained environment since the first quarter of 2010," Pierson explains.

The capacity crunch can be seen in the semiconductor industry's book-to-bill ratio, as reported by SEMI. "Book-to-bill" refers to the total orders booked in a given period against total billings for that period and represents a measure of demand versus supply in the industry. Against a 20-year average of 1.00, the figure fell as low as 0.47 in January 2009, but by January 2010 the ratio had surged back to 1.23 as orders rose rapidly. The ratio averaged 1.18 through the first eight months of 2010 before settling back to 1.03 in September, but Pierson believes that the capacity constraints in the industry will last through Q1 of 2011, despite the recent softening as additional capacity comes back online. "Right now everything that's built is going towards hard backlog, but over the next two or three quarters the supply chain will start accumulating inventory," the analyst says.

Given the constraints on components

supply that have affected the electronics value chain over the past four quarters, lead times have been increasing across the industry, and suppliers have been devoting capacity to satisfy demand from their largest, most strategic customers, putting the remainder of their customers on allocation. Even the largest OEMs are not immune to parts shortages that impact their own suppliers: Japanese automaker Nissan Motors, for example, was forced in July to stop production lines at four of its domestic plants after a supplier was unable to deliver engine control units due to a shortage of key integrated circuits used in the units. Elsewhere, General Electric reported that supply constraints for electronic components used in its healthcare equipment cost the company $50 million in sales in one quarter alone this year, according to a *Wall Street Journal* report.

The Lesson of the Recession

The past three years have been a stark reminder of the impact of downside and upside volatility on the supply chain. But it also reinforces the need for an emphasis on supply chain flexibility in the face of parts constraints, whether caused by regulated materials, EOLs in a recession, capacity shortfalls in the upturn or any number of other reasons, according to Rory King, director of global product marketing with IHS.

"The recent turmoil in the economy has resulted in a highly constrained, high-anxiety supply chain. Things were lean to the point of being taught and brittle, with a great deal of skepticism built into any inklings of a recovery in demand," King says. "Worse, the economic situation overshadowed material shortages imposed by regulations such as EU RoHS and EU REACH that caused both consumers and makers of components containing hazardous substances like lead or DEHP to redesign these out of their product portfolios. The net effect is a self-manifesting downward slide in manufacturing sources for restricted substances, triggering facility closures, discontinued products or design changes to components using these materials."

Undetected, product changes or discontinuances can each have serious ramifications on downstream customers. "Many OEMs are sitting there with entire bills of material (BOM) with literally thousands of parts which they have no idea were subject to unforeseen EOL or other supply chain disruptions," King added. "One systems manufacturer we worked with was not aware that more than 35 percent of the components they used had experienced inherent material changes within the components themselves. Not only do situations like this impact the fundamental design characteristics of the components, but being out of sync with materials use can expose them to major risks in areas like price and availability or environmental compliance."

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>
> — Rory King, director of global product marketing, IHS, Inc.

A Future of Expecting the Unexpected

Some companies are fortunate to have advanced component lifecycle management tools to forecast obsolescence, mitigate obsolescence issues, and plan strategically to minimize future obsolescence impacts. IHS, for example, offers such advanced analytics, coupled with rich electronic component content, to provide its customers with leading indicators like predicted years to end-of-life (YTEOL) for each electronic component. Customers can use metrics like YTEOL in order to decide whether anticipated future component availability meets their needs or if they should explore alternate parts, manufacturers or designs to optimize and ensure continuity of their supply chain.

But King asserts that many companies still have less advanced obsolescence tools based solely on predictive forecasting – or worse – none at all. He suggests these are insufficient for the current market situation, and he recommends that companies consider, at a minimum, adopting solutions like the IHS alerting services that monitors customer BOM and notifies them of immediate lifecycle, supply chain or regulatory events as they occur. This, he says, allows companies to combine strong proactive planning and mitigation capabilities with the ability to respond to unexpected volatility that flies in the face of what he calls "naturally predictable variability." "All members of the electronics value chain need to be more acutely aware of unpredictable shocks to the system that create immediate, unexpected component supply and demand discontinuities. Anything less than prompt adaptation to lifecycle and supply chain events means that companies are rolling the dice and likely exposing themselves to part shortages, growing lead times, higher prices or – worse – counterfeit parts."

And indeed, counterfeits and inferior grade components are a real and present threat to the supply chain. This is apparent from mainstream media coverage, as well as the research

conducted by *Supply & Demand Chain Executive* magazine in 2009 to assess the scope and impact of these components in the supply chain. The research confirmed the widespread impact of these parts on products, operations, brand and safety, in addition to their rapid ascent to the C-suite executive radar among companies throughout the supply chain.

Thou Shall Avoid Supply Chain Risk

Fakes and substandard parts have a particularly troubling impact on industries like aviation or medical devices where the potential loss of human life is real. This was captured quite vividly in the study, where one respondent noted how "counterfeits harm patients and pose a significant risk of death," while another remarked how "counterfeiting jeopardizes our missions and soldiers' safety." Among the study findings, when asked about the gross frequency of counterfeits in their supply chains, the majority of respondents were either unsure (35 percent) or believed that 1-2 percent of the components purchased by their company were suspected counterfeits (28 percent).

These numbers couldn't be closer to the truth facing manufacturers, according to Mark Snider, founder and president of ERAI, a privately held global information services organization based in Naples, Fla. "It's common that 1 percent to 3 percent of parts found on bills of material we see coming from OEMs are counterfeit, substandard or high risk parts," he remarks. "Just one counterfeit part incident poses risk ranging from catastrophic brand and financial damage to costly disruptions such as a halt in production or engineering work associated with a major redesign. When this same 1 to 3 percent is expressed in more absolute terms – real parts numbering in the hundreds or thousands for most companies – it rightfully sends alarm bells ringing throughout the organization. This should be a real cause for concern for companies lacking formal efforts to mitigate, detect and resolve the threat of counterfeits."

The increasing incidence of counterfeits throughout the supply chain, the serious threats they pose, and the high level of attention being devoted to the issue, point to the need to view counterfeiting as a strategic supply chain issue, not merely as a tactical part issue. And this, according to Snider, is exactly what leading defense contractor L-3 Communications is doing. "I've come across very few companies with the organizational engagement and commitment from the executive level, to mobilize the people, process and technology necessary in order to detect and mitigate dangers from potential counterfeit parts," praised Snider. "L-3 Communications can be a role model for industry in leading the charge when it comes to the mitigation of supply chain risks and component obsolescence."

> **"Just one counterfeit part incident poses risk ranging from catastrophic brand and financial damage to costly disruptions such as a halt in production or engineering work."**
>
> — Mark Snider, founder and president, ERAI

L-3 Communications employs more than 63,000 employees and has grown very quickly into one of the largest defense companies in the United States. In a company known for providing its business units with the latitude to operate autonomously, it has established executive level commitment and mobilized a central effort to combat component obsolescence and counterfeit risk. It has even established a set of guidelines stipulating that all component purchases from independent distributors shall run through the ERAI solution to assess potential risk from counterfeiting. L-3 compliments this with its use of IHS lifecycle management tools to manage component lifecycles and identify potential obsolescence risk.

"While the complexity of the electronics value chain cannot be understated, the issue of information and insight that companies should incorporate to combat today's generation of market pressures is fairly simple to explain," King adds. "Take the lessons learned from EU RoHS [restricting lead, cadmium and other substances] and apply these to new US legislation regulating so-called 'conflict minerals' like gold, tantalum or other minerals sourced from the Democratic Republic of the Congo. Whether large or small in nature, there should be a material impact to components that results in increased component EOL activity, which is a key indicator for material shortages that, in and of themselves, bring about rising lead times that indicate an imminent increase in marketplace counterfeit part activity. Companies leveraging advanced obsolescence management capabilities, supply chain alerting tools, price/lead time tracking services, and counterfeit detection and resolution solutions are poised to sense and respond each step of the way. This will be to their strategic advantage, while those that don't will have tactical disadvantage and performance slips along the way. It's as simple as that." ■

Get off the Commodity Rollercoaster

Procurement organizations must take a more strategic approach to managing commodity price intelligence

John Mothersole
Principal
Industry Practices Group
IHS Global Insight

By Editorial Staff

Commodity prices have been on a rollercoaster ride over the past five years. The run-up in prices during the most-recent "super cycle" peaked in mid-2008, according to various indices. The widely watched IHS Global Insight Industrial Materials Price Index (GIIMPI), for example, reached a high-water mark in July 2008 before precipitously plummeting through the end of that year, giving up most of the gains accumulated over the previous six years. (See **Figure 1**.) But 2009 saw commodity prices claw their way upward again, and continued gains in 2010 put margins at risk for many companies as weak consumer confidence made it unpalatable to pass cost increases on to end customers. Copper, for example, traded at highs around $9,000/tonne in early 2008, but crashed to a low just under $3,000 by the beginning of 2009 – only to recover to over $8,500 by October 2010.

This commodity price volatility is not a surprise to John Mothersole, a principal in the Industry Practices Group at IHS Global Insight, the economic and financial information and forecasting business of IHS, Inc. Mothersole, a nonferrous metals analyst and a 30-year forecasting veteran with IHS Global Insight, points to the increased instability in raw material prices since 2000. "If you look back at specific time periods over the last 20 years across any number of commodities or sectors, what is striking is that the volatility has increased as you move forward in time," says Mothersole. Economists looking to explain the surge in volatility point to factors as diverse as the increasing demand for goods among rapidly growing middle-class populations in emerging nations like Brazil, China and India, the impact of extreme weather, or the growing influence of investors.

This persistent rise in volatility has served as a symptom of the increased risk environment of the "New Normal" economy and has certainly captured the attention of supply chain executives: AMR Research, now part of Gartner, has documented in its quarterly supply chain risk surveys that supply management executives viewed commodity price volatility as a "top three" risk in their supply chain. In response, procurement departments have started to employ strategies like hedging or crafting long-term contracts with price adjustment clauses. However, Mothersole suggests that companies also could benefit from putting in place a process for effectively and strategically leveraging commodity price intelligence.

The Long View of Prices

The key to understanding commodity prices, Mothersole says, is recognizing the tremendous amount of information contained within prices, including the costs underlying the production of a given commodity and the supply and demand dynamics that are driving changes in the price of that commodity. "You need to have a long enough historic perspective so that you can place current events in their proper context and gain an understanding of what is driving price changes," explains Mothersole, whose background is in economics. This more sophisticated perspective on price drivers, in turn, serves as the basis for understanding where prices are heading in the future and the foundation for more advanced risk management strategies like hedging.

The most recent commodity price super cycle offers a simple example of how this long-term perspective can benefit an organization. By 2007 and 2008, IHS Global Insight began to see price levels across virtually all commodities rising well above their long-term trend path when viewed over a 20- or 30-year time span. That led analysts like Mothersole to look at the cost drivers at work within specific industries to see whether the cost profile underlying a commodity had fundamentally changed.

"What we found in most, although not all, cases was that relative to costs, prices were elevated, and we saw very wide margins in a large number of industries," Mothersole says. "Those

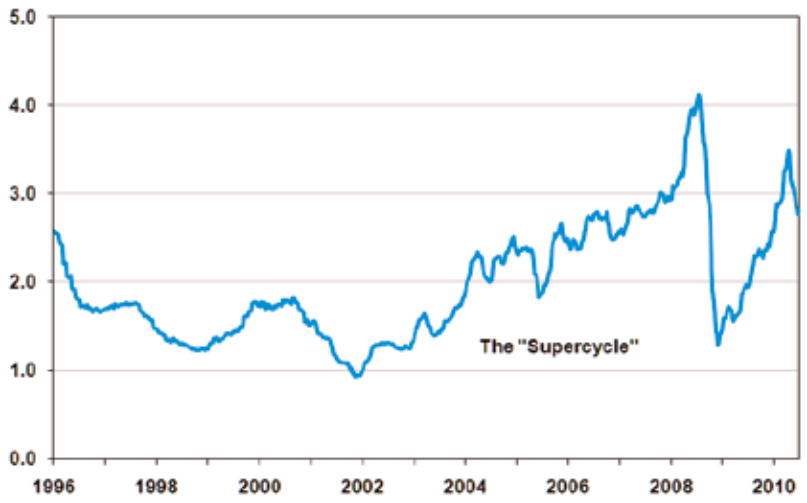
kinds of profits are usually self-ending in the sense that if markets are flexible enough to react, they will work to eliminate those kinds of excess profits." The conclusion that the high price levels were not sustainable would lead a procurement organization to a different set of strategies (shorter-term contracts, for example) than a belief that prices were going to continue to rise unendingly (which might dictate locking in longer-term contracts).

A Strategic Approach

Mothersole suggests that a company aggregate its spend into buckets that can be assigned to purchasing codes and given a relevant market price measure, so that the company can understand which commodities it should be tracking. With that as the foundation, the company can put in place a centralized data gathering and monitoring process, supported by the necessary data management systems, to allow them to effectively track price movements over time for the commodities that matter – or matter most – to that specific company.

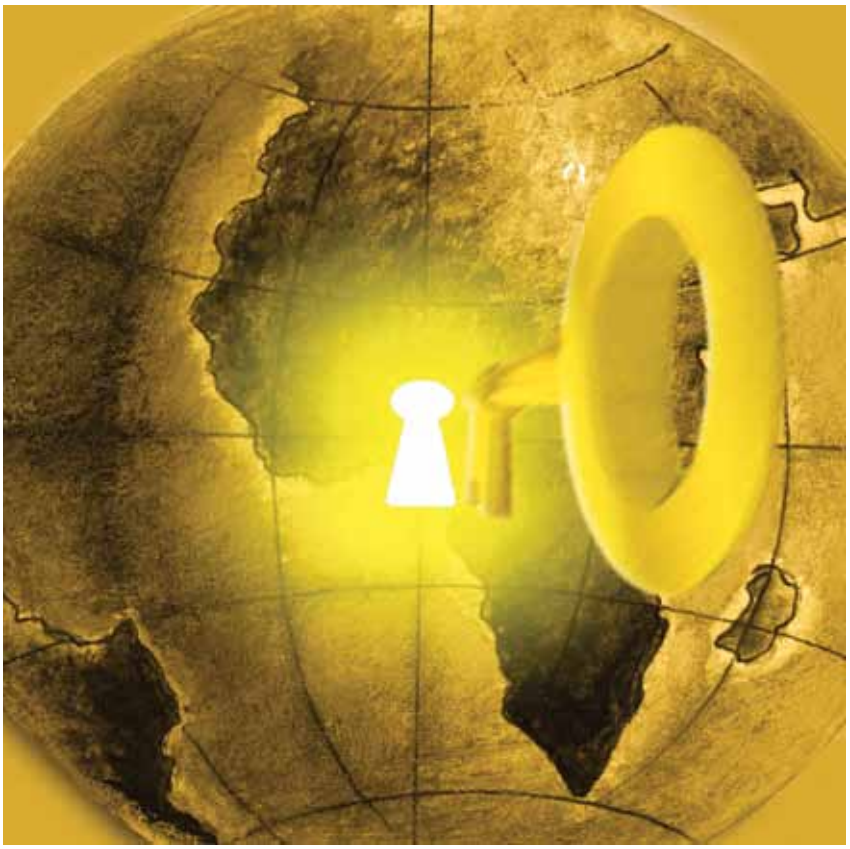
Next, tap into the kinds of historical databases of pricing information that an organization like IHS Global Insight can provide, so that the company can understand the trend lines for its critical commodities. The goal initially is not to try to forecast where prices are headed but rather to monitor the marketplaces across the array of materials that the company purchases. However, once a company does gain that historical perspective, it can start looking at price forecasts for those commodities, peering quarters or years into the future and assessing the impact on the company's cost structure based on the kind of forward-looking data that Mothersole's Pricing and Purchasing Service offers. Procurement staff can leverage that information as the foundation for hedging and other strategies to mitigate the impact of price volatility. Over time, the company should be able to establish pricing benchmarks to rate their performance against their industry's cost curve – and to peg variable compensation of procurement staff and executives to that performance.

Figure 1. Global Insight Industrial Materials Price Index less Oil, 2002:1=1.000



Mothersole's company consults with procurement organizations to help them implement and leverage the kinds of processes and systems described above, and he points to several success factors for these sorts of initiatives. "The organizations that tend to use the information more effectively usually have a central authority within the organization that is responsible not necessarily for collecting the information but for analyzing it," he advises. It often falls to individual buyers or purchasing managers to maintain an information structure or flow related to their specific area of expertise, but it's critical that the information not remain siloed. Rather, the buyer or manager should be responsible for pushing the information up to that larger, central analytical organization – a sort of "central intelligence agency" within the supply management function that can look more broadly or strategically across the company's spend. These analysts often come from diverse functional backgrounds, whether from manufacturing, finance or engineering. Moreover, they typically will work cross-functionally, establishing lines of communication with engineering, for example, to understand the company's engineering requirements and how those will shape its supply needs.

Perhaps most important, Mothersole says that procurement staff must build a competency in seeing the forest for the trees. Incorporate a variety of sources into an analysis of commodity prices, ranging from the type of historical and forward-looking data that a company like IHS Global Insight offers; to government sources of information like US Department of Commerce and US Geological Survey, or the Australian Bureau of Agricultural and Resource Economics (ABARE); to mainstream media like *The Economist*, *The Wall Street Journal* or *The Financial Times*; to new media blogs and other Web sites. "It's valuable to collect as many pieces of the puzzle as you can, so that you can put together a mosaic, and the more puzzle pieces you have, the more complete the picture," Mothersole says. "But what's critical is being able to see that whole picture from the individual pieces." ■



Supply Chain Compliance: Best Practices from the Congo

Lessons learned from African responses to the U.S. Conflict Minerals law can be the difference between approved seven-figure funding and continually spinning your tires on Environmental Compliance

By Rory King

As many *Supply & Demand Chain Executive* readers know, the United States passed legislation July 21, 2010, on so-called "conflict minerals" that include gold, tin, tantalum and tungsten used in products that are possibly linked to armed groups and human atrocities associated with trade exploitation within the Democratic Republic of the Congo (DRC) and neighboring countries in the region. While most industry professionals are still trying to get their arms around this law or dismiss its complex timeline of "TBD" deadlines and implications, Africa's International Conference on the Great Lakes (ICGLR) has immediately mobilized an aggressive strategy in direct response.

We are often asked why some companies gain seven-figure funding and the nod to move forward with "environmental compliance" programs while others spin their tires, getting rejected with much lower amounts. Whether it applies to conflict minerals legislation itself or issues like RoHS recast, REACH legislation or even the controversial Bisphenol-A (BPA), the ICGRL's approach to conflict minerals is an excellent example of viewing so-called compliance as a more critical supply chain risk situation with a much higher value proposition to the organization. The ICGLR case study can be dissected into essential best practices that answer the question of why product stewardship/compliance programs sold internally with ROI based on risk, revenue and reputation can gain rapid approval versus failed attempts for even limited resource support.

Act Immediately: Design Cycles Exceed Regulatory Timelines in Most Scenarios

Africa's ICGLR is made up of member states that include Angola, Burundi, Central African Republic, the Republic of Congo, the Democratic Republic of Congo, Kenya, Rwanda, Sudan, Tanzania, Uganda and Zambia. In addition to the DRC, each of these countries are implicated in the US conflict minerals law. Almost immediately after the conflict minerals legislation was passed, the ICGRL assembled its stakeholders to mobilize and carry out a regionally unified strategy. Various players from the mining sector, including regional and international organizations and the ministers of mineral resources from 11

countries, began to assess the broader implications of the legislation on the mining sector and the member states. On September 23, 2010, the Executive Secretariat organized a series of meetings to tackle the issue of illegal exploitation and illicit trade in natural resources. The ICGRL then publicly articulated a strategy that would introduce a regional certification scheme guaranteeing the conflict-free source of minerals, harmonize member states' legislation governing mineral resources and establish a database on regional mineral flows.

The first lesson that can be learned from the ICGLR and that supply chain practitioners can directly apply to their own thinking on environmental compliance is that of time. With conflict minerals, like other product stewardship and compliance concerns, the materials in question were already subject to varying degrees of demand volatility and downward pressure from social forces from non-governmental organizations (NGOs) like the Enough Project or Global Witness attempting to bring accountability to electronics manufacturers and eliminate complicity in trade exploitation. The moment a new or pending regulatory restriction is even discussed, this volatility accelerates, transforming into a more impactful demand shock that reverberates throughout the supply chain. This impacts the entire competitive framework and jeopardizes one's current status as a supplier by leveling the playing field.

The ICGLR did not focus on, nor wait for, regulatory timelines and deadlines to materialize. They acted immediately and realized with a sense of urgency that they needed to provide their end-customer – the US and broader global markets – with transparency on the issue. They realized they would need every minute prior to voluntary boycotts or actual regulatory obligations to build and retool their infrastructure well ahead of those timelines, regardless of when, how or even if they materialize. From a best practices standpoint, leaders don't sit on the sidelines and wait for finalized regulation or unanimous decisions on a chemical health and safety debate.

It's Your Continuity as Supplier to Market, not "Compliance," from which to Build Your Business Case

The next lesson to be learned from Africa's nations is that "perception is reality" and that one's reputation as a supplier, and subsequent continuity of revenues, immediately enter an almost unfair "guilty-until-proven-innocent" supplier status. In this case, the ICGLR realized immediately that each of the countries in the region surrounding the DRC were implicated by this US legislation and would be viewed as complicit in the trade exploitation and atrocities going on in the region. Simply put, there are very real fears that US companies may simply ban minerals sourced from the region altogether. In other words, a path of least resistance may be taken by the US and other markets. The ICGLR member states' reputations ("brands") were in question, and minerals from the region could be entirely rejected within global markets ("major customers"). Ultimately this would have the same effect as having poor status as a "supplier" to global markets, and their market share and subsequent revenues would decline.

In original research conducted in the late summer and fall of 2010, a *Supply & Demand Chain Executive* survey respondent documented risks and rewards to the respondent's company by saying, "Compliance and our reputation as an ethical company [is where we have conflict minerals risk exposure]. Our benefit is to make our customers' lives easier. End consumers shouldn't be burdened with the task of discerning which products are ethical." Regardless of a company's regulatory culture or views on the issue, this perception looms in the market and has a tangible effect on a company's status as a supplier and its performance in the marketplace.

Transparency – Internal or External – Is Your Key to Survival in the Sustainability Generation

In their response to US conflict minerals legislation, the ICGLR realized that its survival in the global market and credibility as a worthy supplier of minerals to these markets were dependent upon a strategy of transparency over mineral sources and material flows throughout the region. The cornerstone of their transparency was declared to be a unified database that brought together all countries in the region and unified their approach to collecting and distributing information on regional mineral flows.

The best practice here to apply to environmental compliance programs is twofold: It's the simple, yet somehow profound, realization that internally capturing supplier information that enables the program strategy is critical – ***and*** that transparency is the key to (continued) survival in the downstream supply chain. So many environmental compliance programs focus on software and reporting tools implementation only to label them an "empty box" lacking the necessary substance to drive their strategy. Certainly, a robust technology infrastructure is necessary to house a large and complex array of data, but you can't automate what isn't there. Fundamentally new and previously unavailable data are required from suppliers, and those data aren't

necessarily easy to obtain. Meanwhile, decentralized compliance program silos throughout a company and/or a linear regulation-by-regulation approach is costly and inefficient. Best practice, as exemplified by the ICGLR, is to centralize and standardize a cross-company approach to gain economies of scale and optimize the supply chain.

Standardizing Supply Chains Lowers Risk and Cost of Ownership, and Improves Time-to-Market

Continuing the theme of a standard database, what can also be learned from the ICGLR is how each individual African member state came to the table and formed a single standard to approach both the problem itself and the enabling database to execute their strategy. Another inherent lesson to be learned is that competitive differences or regional disagreements among individual member states were a non-factor in favor of both the explicit end to exploitation, and the imminent and urgent threat to continuity as a supplier to global markets.

Key environmental compliance best practices to learn from here are threefold. First, an individual company stands to gain from establishment of a comprehensive, forward-looking material content and product development standard to serve as a common platform to optimize operations. Second, business objectives of individual companies can be dramatically improved by coming together and standardizing on a single industry standard. Most notably the shared goals would include risk mitigation from material issues (such as supplier viability, lead time, obsolescence and shortages) and reduced total cost of ownership (e.g., efficiencies and cost from supplier communication and data collection) from economies of scale. Thirdly, although the ICGLR case example breaks down here, notionally a third party who offers supply chain and environmental compliance information and insight as a core competency can deliver both higher quality and economies of scale of a one-to-many central data model. Individually, or as a group, "the many" can gain advantage in the form of faster time-to-market and lower total cost of ownership.

A great example of industry standardization is the Priority Declarable Substances List (PDSL) that was created by the Aerospace and Defense Industries Association of Europe to classify not only hazardous chemicals to support EU REACH, but also suspected future restrictions. Beyond compliance, it had the foresight and motivation to outline its primary concerns as the awareness of – and preparation for – issues associated with continuity of supply as chemicals change throughout the extremely long lifecycle of the A&D industry's products.

In the healthcare value chain, recognized sustainability leader and *Supply & Demand Chain Executive*'s 2010 Green Supply Chain Award winner Kaiser Permanente is trying to use the $1 billion worth of medical equipment and products it uses within its hospitals, medical offices and other facilities to drive change within its medical supply base. In 2010, it launched its Sustainability Scorecard for Medical Products as a purchasing initiative to drive sustainability and workplace safety, as well as improve public health. Certainly, suppliers are eager to satisfy the demands of such scorecards, but for many, satisfying the needs of Kaiser and other environmental regimes and customer requests is proving to be, in and of itself, unsustainable. Medical manufacturers are dealing with antiquated and disparate systems, dated engineering specifications and drawings, and rudimentary preferred parts and supplier lists that are more mature concepts in other industries.

What Lies Ahead

What lies ahead for the ICGLR is unclear. It's an understatement to say they have a very onerous task at hand to undermine the illegal networks fueling violence in the region and to disrupt the illicit trade in mineral resources in the Great Lakes Region and particularly in the Democratic Republic of the Congo. A great deal of adversity stands in their way on the path to peace, stability and economic development in the region. However the story unfolds, much can be learned from the immediacy, foresight and actions of the ICGLR in response to the conflict mineral legislation enacted by the United States. Specifically, its approach parallels best practices taken from leading organizations across a variety of industries in how they view and approach environmental compliance, product stewardship and supply chain sustainability issues. Supply chain practitioners who learn how to apply lessons learned and leverage these best practices should ultimately be able to articulate the true business impact and supply chain risks and rewards that become more meaningful top to bottom and across the organization. Those who do will understand how to build a stronger business case to drive greater value and mitigate the risks associated with supply and demand volatility amidst a world in transition. ■

About the Author:
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Regulating Conflict Minerals: A Supply Chain Perspective

Caught between compliance, conscience and cost, companies must start formulating their conflict minerals strategies now

By Editorial Staff

In early November 2010 a tin industry group threw up a warning signal on so-called "conflict minerals" that sent prices higher on key metals used in the electronics supply chain. The group, ITRI, announced on November 8 that a project to keep conflict minerals out of the supply chain was unlikely to meet a March 31, 2011, deadline to put in place an effective system of "tagging" to track-and-trace the country of origin for these minerals. As a result, UK-based ITRI said, tin and tantalum coming from the affected region – the Democratic Republic of Congo (DRC) and adjoining nations – were likely to face an embargo.

The markets took that as a signal that supplies of the metals could tighten worldwide. In fact, immediately following ITRI's announcement, prices on tin started ticking upwards as buyers absorbed the news and sought to lock in supplies ahead of the possible loss of metals supplies from the DRC and surrounding nations. Prices on tantalum were expected to reach new highs by the end of the year as companies scoured the market for alternative sources of supply.

ITRI's statement and the market's reaction exemplify the conflicting pressures and risks facing companies in the electronics supply chain and beyond that rely on tin, tantalum, tungsten and gold, the four commonly cited "conflict minerals." Enterprises in the US face regulatory deadlines in 2012 for being able to report on whether their products contain conflict minerals sourced in the DRC, and yet it remains unclear how they will gain the necessary visibility that deep into their supply chains. At the same time, advocacy groups are continuing their efforts to increase public pressure on companies to exclude conflict minerals from their supply chain. And the conflict minerals regulations tucked into the back of the massive Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, signed into law July 21, 2010, are already having an impact on the cost of these minerals on the broader market.

Caught between compliance, conscience and cost, companies should already be formulating their "conflict minerals" strategies now to mitigate the impacts and risks likely to result from the law in 2011 and beyond. However, a recent survey of nearly 200 US and global enterprises revealed that many companies are not even aware of the conflict minerals issue, let alone the impending regulatory mandates. This article reports on the results of this survey and also offers a strategy for beginning to prepare for the legal requirements imposed by the Dodd-Frank Act.

Background: Conflict Minerals Primer

Supply & Demand Chain Executive has covered the conflict minerals

issue in conjunction with IHS in articles and Web conferences, and links to those resources can be found at www.SDCExec.com/CMUpdate. These materials provide extensive background on the issue, the Dodd-Frank Act and the industry's response to the law's requirements.

In brief, the Democratic Republic of the Congo, located in Central Africa, is about 900,000 square miles in size, or about as big as Alaska and Texas combined. With a population of approximately 71 million, the DRC is nearly twice as populous as California. The country is, by all accounts, fantastically wealthy in terms of natural resources, with estimates of its total mineral wealth ranging in value from $10 trillion to $24 trillion. However, its GDP of $22 billion is about equal to that of Vermont or Wyoming.

The country has been in a state of civil war for the past 15 years in one form or another. The result of this conflict has been the deaths of more than 5 million people by 2008, with 45,000 deaths still occurring monthly, according to reports from the region. Armed groups that include the Congolese Army and the Democratic Forces for the Liberation of Rwanda, or FDLR, are viewed as the main, but not the only, players in the minerals trade. These and other armed groups control 12 of the 13 major mines—more than 50 percent of the 200 total mines—in Eastern Congo, the primary source for conflict minerals. Estimates are that the different armed groups involved with conflict minerals derive between 15 percent and 75 percent of their revenues from the mineral trade.

The armed groups involved in the minerals trade often resort to forced labor, including child labor, to staff their mines, and reportedly force miners to work 48 hour shifts. One of the most disturbing aspects of the conflict has been the widespread use of sexual violence against local populations and workers in and around the mines as a form of coercion and control. The violence has prompted a number of non-governmental organizations, or NGOs, to become involved in promoting solutions to the conflict and the human rights issues within the country. The groups Global Witness and The Enough Project have led these efforts, which have included stepping up pressure on manufacturers – particularly well-known consumer electronics brands – to eliminate conflict minerals from their supply chains.

More than 50 percent of companies will need to implement a program to identify the country of origin of raw materials used to ensure compliance. That is a brand new requirement without precedent in the supply chain.

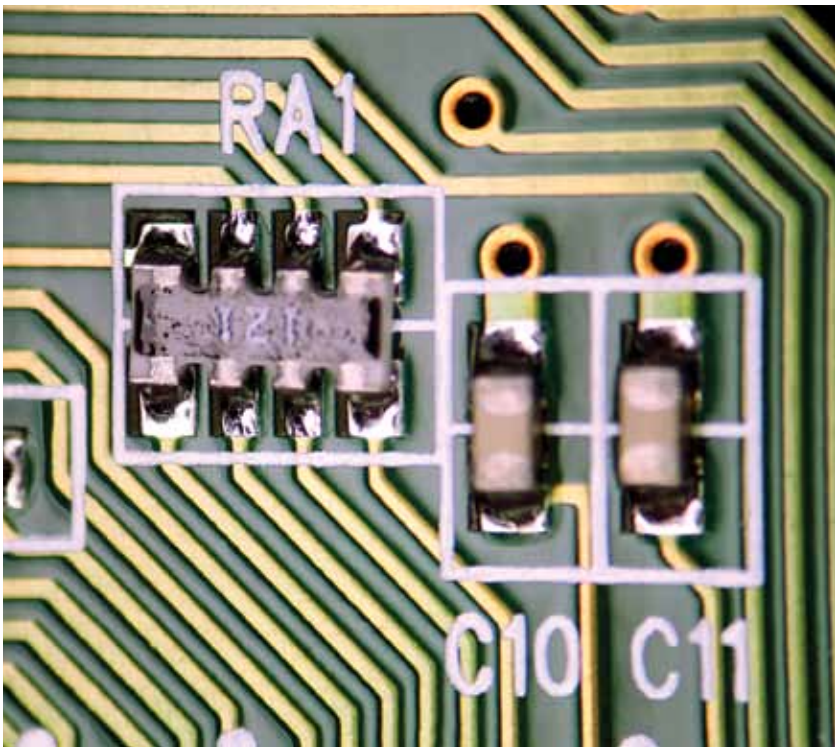
The Law: Dodd-Frank Act, Section 1502

The US Congress initially took up the conflict minerals issue in a 2009 bill sponsored by Senator Sam Brownback (R-KS). The bill appeared to die in committee but was resurrected later that year in the House, eventually being added as an amendment to the Senate financial reform bill and passing both houses of Congress. Section 1502 of the bill, signed by President Obama on July 21, 2010, specifically addresses conflict minerals. The stated aim of the legislation is not to ban the use of these minerals if they originate from the DRC, but rather to ensure that the minerals do not come from conflict areas of the DRC or would otherwise help fund the conflict.

To this end, Section 1502 requires annual disclosure to the Securities and Exchange Commission (SEC) regarding whether potential conflict minerals originated in the DRC or an adjoining country. If the minerals originated in these countries, companies must report on the due diligence measures that they utilize to identify the source and chain of custody. These measures are expected to include an audit by an independent professional audit company. In the SEC report, companies also must submit a description of products that they manufacture that are not DRC conflict-free. Products are conflict-free if they do not contain minerals that directly or indirectly finance or benefit armed groups in the DRC or an adjoining country.

Manufacturers that use conflict minerals originating in the DRC or an adjoining country are still free to use these minerals. However, they may face liability for failing to disclose their sourcing practices accurately. The Act will also impact manufacturers that are not subject to SEC reporting requirements but whose use of conflict minerals is "necessary to the functionality or production" of their products. Specifically, the US Comptroller General must submit an annual report to the U.S. Congress identifying such companies beginning in July 2012.

Of course, this is just a high-level summary of the requirements of the bill, and companies that might be subject to the Act's provisions would



be wise to both read the full six pages of Section 1502 (a link to the text of the law will be provided at www.SDCExec.com/CMUpdate) and refer their peers and colleagues to the law as well. The law imposes specific legal requirements, but is also an evolving issue, with significant regulations yet to be issued and/or subject to change over time. Cross-functional attention to the issue and professional legal assistance will be necessary to ensure compliance.

The Survey: Awareness and Preparedness

After the law's passage in July, *Supply & Demand Chain Executive* and IHS initiated a research project to understand awareness of the conflict minerals issue and Dodd-Frank legislation, benchmark preparedness to meet the law's requirements, assess supply chain exposure to pending legal requirements, and identify strategies for dealing with Dodd-Frank across the supply chain. That research included a survey of executives at 190 US and global enterprises, conducted from July through September 2010. The research also included interviews with nearly two dozen industry practitioners, analysts covering the electronics supply chain, and subject matter experts at IHS with extensive experience dealing with compliance and supply chain issues.

Perhaps the most startling finding from the survey was that only slightly more than half of the respondents (55 percent) were even aware of the conflict minerals law prior to taking the survey. "This is a regulation that 'snuck up' on a lot of people," says Scott Wilson, a senior content strategist at IHS who works with clients on information and insight solutions to address challenges in the supply chain such as component management, supply chain risk mitigation, counterfeit parts and environmental compliance. Wilson notes that companies like the 45 percent of respondents who were just learning about conflict minerals should begin immediately on the research, risk analysis and strategizing that must be done in order to understand the level of effort needed for compliance with the law. What about the respondents who already were aware of the regulation? "These folks know they have their work cut out for them, too," says Wilson. "Most realize this represents a fundamental change in the information they need and how they will need to collaborate with their supply chains."

The extent of the challenge for companies in meeting the requirements of the law can be seen in two other significant findings from the survey. First, when asked whether their companies use the various potential conflict minerals in their products, the affirmative responses ranged from 45 percent for coltan (tantalum) to 63 percent for cassiterite (tin). "This tells us that the use of potential conflict minerals is widespread," says Wilson. "But it also tells us that more than 50 percent of companies will need to implement a program to identify the country of origin of raw materials used to ensure compliance. That is a brand new requirement without precedent in the supply chain."

What's more, Wilson points to the 93 percent of respondents who said they believe that identifying these minerals in their products, and their origins, will not be easy, including 42 percent who said that it would be "very difficult" to do so. "People know this is going to be difficult," Wilson says, "and they are unsure of how to collect this information. It might sound easy — just ask your suppliers; but, in these truly early days it will be hard to get responses immediately, let alone responses you can have confidence in. But starting the process and asking your immediate suppliers is the first step."

Taking Action: Challenges and Strategies

Opinions were almost equally divided on how the conflict minerals issue compares with the impact on the supply chain of the European environmental regulations RoHS and REACH – a useful point of reference since many companies already have been dealing with these regulations for a number of years. A combined 37 percent said conflict minerals regulations would have the same or higher impact as RoHS/REACH, while 33 percent say it will have less of an impact, and almost a third are unsure. However, as one supply chain professional noted in a comment on this question, "[The] requirement to report annually to the SEC and to submit a due diligence plan (audited and certified by an independent 3rd party) will generate more high level attention [within the enterprise] compared to RoHS/REACH issues." Another respondent pointed out that while RoHS and REACH offered long lead times to prepare for their impact over a number of years, Dodd-Frank imposed much tighter timelines. "Very complex discovery and reporting process, too little time to react, and restriction of these materials [put] the EEE [electrical, electronic, and electromechanical] supply chain at risk," the respondent summarized.

Asked about the top two barriers to meeting Dodd-Frank's reporting requirements, respondents most frequently cited the technical feasibility of tracking and tracing the affected materials (37 percent), followed by the cost of compliance (28 percent) and lack of third-party enablers (24 percent). On the other hand, asked about the top two drivers that would prompt action on conflict minerals, 42.5 percent and 38.3 percent, respectively, cited regulatory compliance and customer requests, greatly outpacing other potential drivers like fear of market share loss, risk to brand from negative exposure, or risks to continuity of supply. One executive responding to the survey stated plainly that compliance and his employer's reputation as an ethical company is where the conflict minerals risk exposure lies. "Our benefit is to make our customers' lives easier," the executive wrote. "End consumers shouldn't be burdened with the task of discerning which products are ethical."

> **"People know this is going to be difficult, and they are unsure of how to collect this information. But starting the process and asking your immediate suppliers is the first step."**
>
> — Scott Wilson, senior content strategist, IHS

The reaction of the market to the passage of Dodd-Frank suggests that the risks to sources of supply for key components – as well as to margin – are real. Greg Wood, senior product manager for electronic component solutions with IHS, points out, for example, that past disruptions in the tantalum market have had ripple effects through the supply chain. "We had an instance where there was a shortage of tantalum capacitors based on a fire at one of the raw material manufacturing facilities in China that caused some of tantalum manufacturers to exit that market," says Wood, who has nearly a decade of experience managing critical component information solutions and overseeing global supplier sourcing for various manufacturers. "It wouldn't be surprising to see similar material shortages as a result of the DRC legislation."

Given these risks, companies would be advised to pursue a proactive strategy based on product information management, risk mitigation and supply chain optimization in order to prepare for the "bullwhip" effects that Dodd-Frank may send rippling through the supply chain, says Brian Schirano, a subject matter expert with IHS and a veteran of nearly 20 years in the electronic components industry. The alternative – approaching conflict minerals as an isolated compliance mandate – is a pathway to higher costs and complexity, Schirano argues. "Companies that rank consistently high in 'top 25 supply chain' listings recognize that one-off compliance projects don't deliver," he says.

Leaders, on the contrary, will pursue comprehensive compliance strategies that provide an aggregation of item-level data across the enterprise as a preliminary step toward either verifying compliance or redesigning parts and products for compliance where necessary, Schirano continues. This approach not only can result in increased supply chain efficiencies and reduced total costs, but also can accelerate time to market by moving to a smaller number of approved and preferred vendors, allowing engineers to focus on design issues rather than searching for parts. "Also," Schirano concludes, "manufacturers that gain comprehensive visibility into their parts lists and leverage that visibility to create approved vendor lists and prepared parts lists can see higher material availability and reduced supply chain risk." ■

Plug the "Brain Drain"

Strategies for knowledge management and knowledge transfer

By William Atkinson

It's no secret that supply chain functions today are engaged in what AMR Research has described as a "war for talent." The name of a recent report from the MIT Center for Transportation & Logistics says it all: "Are You Prepared for the Supply Chain Talent Crisis?" The author, Ken Cottrill, points out: "Supply chain faces a severe shortage of talent at a time when the demands on the profession have never been greater... Companies must be more proactive in their approach to recruiting, developing and retaining the supply chain professionals they need to stay competitive."

Meanwhile, we are witnessing major economic and demographic trends impacting the workforce, including downsizing as a result of the recession, as well as an unprecedented generational change as Baby Boomers retire. As these experienced staff walk out the door, they are taking with them years of knowledge and expertise. In effect, they are leaving with a key element of the employer's competitive advantage.

A case in point: "At a recent customer meeting with NASA, we were discussing the fact that almost everyone who had worked on the development of previous manned space vehicles had already retired, and with them, a priceless wealth of knowledge and experience had been lost forever," reports Andy Brown, business development director for IHS ESDU, which provides engineering solutions.

According to Michael Thompson, manager of electronic publishing for engineering association SAE International, the nation has a larger generation of workers who are set to retire, with a much smaller workforce left to fill their shoes in industries that have a growing, not a shrinking, demand for highly skilled workers.

Multiple Leaks in the Drain

The rising demand for engineering talent is illustrative of this dilemma. Despite the recent recession, the US Bureau of Labor Statistics estimates that there is about a 12 percent growth in demand for engineering talent in the United States alone over about a 10-year horizon. Even with the recent economic downturn, the growth rate diminished slightly but didn't go negative by any stretch of the imagination. In fact, it is still about 4 percent. "If your knowledge walks out the door, you have to reinvent it or reacquire it, and that gets very, very expensive," points out Thompson.

And the problem is more severe than just retirements. "Over the last 20 to 30 years, we have seen repeated downsizing and outsourcing operations strip experienced midlevel staff out of many companies, and many of these people are leaving their professions, never to return," says Brown.

A third element to the problem: Many skilled staff working in the US over the years are foreign-born, having come here for better employment opportunities. However, with the expansion of the "world economy," many of these employees are returning to their native lands.

While large numbers of skilled staff are leaving the US, either via past downsizings, upcoming retirements or moves to foreign countries, the number of students in school who can replace them often is not keeping up. "Many companies are trying to fill the void by hiring graduates," notes Brown. However, competition for the best and brightest is fierce. Adding to the problem is that many students who obtain degrees in the US come here from other countries to complete their education, and then return to their homelands for employment.

Plugging the Brain Drain

So what are the solutions to the "brain drain"? Most of them revolve around a concept known as "knowledge transfer." According to Thompson, knowledge transfer in organizations is the process through which one unit, group, department, division and even individual

For a detailed look at strategies and tools for plugging the brain drain in your organization, see the on-demand Webcast "Addressing the Engineering Knowledge Vacuum" at sdcexec.com/242472

is affected by the experience of another.* "We can think of knowledge transfer as organizing and capturing information for current and future generations," he says. It is not merely a one-time communication, and it is not an e-mail or a memo. It is a way to capture and relate knowledge between and among individuals or groups in a manner such that the knowledge lives on.

According to Brown, companies must be systematic in knowledge sharing to realize the full benefits. "Building a collaborative culture requires a systematic approach to knowledge sharing, and leveraging knowledge for continuous improvement requires changes to a company's culture," he emphasizes.

Brown continues: "It is essential that companies begin their knowledge capture process as soon as possible." In addition, they must be systematic in knowledge sharing to realize the full benefits.

For example, at NASA, in response to its engineering brain drain, the agency set up a network to promote learning and sharing among NASA's engineers. "As a program- and projects-oriented agency, NASA recognized the need not only to gather best practices and review lessons learned, but it was also key that those lessons be shared throughout the whole organization and not just with individual project teams," notes Brown.

Techniques for Knowledge Transfer

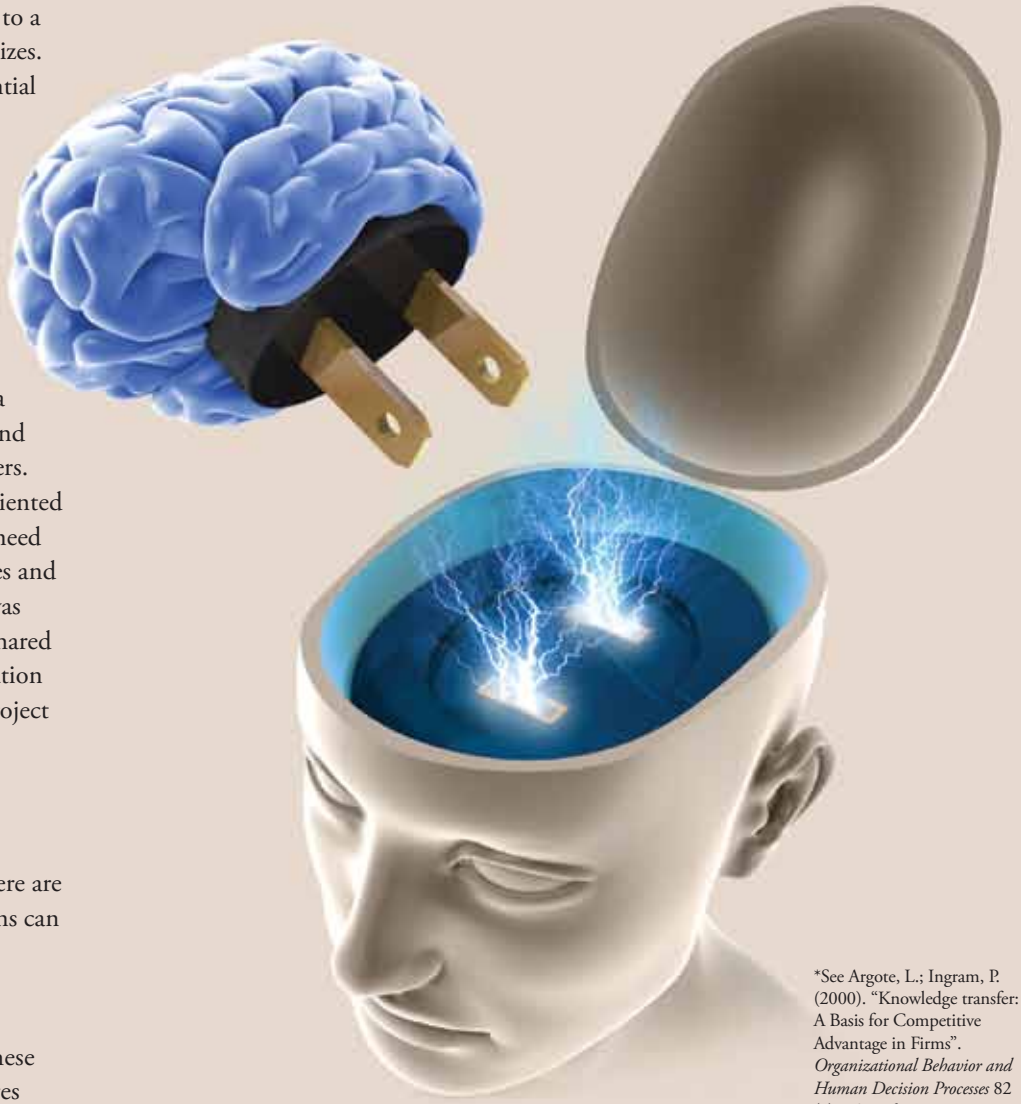
According to Thompson, there are two ways in which organizations can pursue knowledge transfer.

One involves formal and traditional processes that have been practiced for decades. These include documented procedures such as instruction manuals, videos, archives, expert systems and job aids, such as flow diagrams, checklists, reference tables and decision trees. "Success here involves increasing documentation for every process and procedure," he says.

The other involves more informal and less traditional processes. "What we have been seeing more in the last couple of years is the desire to capture the experiential knowledge of the workers who are about to retire," he explains. "These are people who have built up knowledge over decades – knowledge that isn't necessarily documented as part of a procedure or process."

According to Thompson, mentoring is at the top of the list here. "Research indicates that this is the most impactful way to relate experiential knowledge, because, if done properly, it allows for a long-term relationship of trust and collaboration between the mentor and the mentee," he explains.

Other related methods include storytelling, lunch-and-learns, critical incident reviews, lessons-learned debriefings and job rotations. With job rotation, individuals are identified on particular career tracks and are rotated on six-month cycles through an organization, so they have the benefit of partnering



*See Argote, L.; Ingram, P. (2000). "Knowledge transfer: A Basis for Competitive Advantage in Firms". *Organizational Behavior and Human Decision Processes* 82 (1): 150–169.

"One of the keys to successful mentoring programs is first being able to successfully anticipate the retirement pattern and the impact that the retirement pattern might have on your company, and then create a program to address it."

— J. Kevin Perry, managing director for professional development with SAE International

with experienced leaders in different parts of the organization.

Thompson also cites some external opportunities for knowledge transfer. These include ERP systems, white papers, standards, and collaboration and training with suppliers.

Opportunities can be "sliced and diced" a different way, too. According to J. Kevin Perry, managing director for professional development with SAE International, there are four general opportunity areas to engage in knowledge transfer. These are mentoring programs, internal knowledge capture and share techniques, internal company training and externally sourced training. The latter can include training offered by universities, associations, vendors and alliances. "One of the keys to successful mentoring programs is first being able to successfully anticipate the retirement pattern and the impact that the retirement pattern might have on your company, and then create a program to address it," he adds.

Barriers to Knowledge Transfer

While the need for formal and informal knowledge transfer strategies and programs is pressing, there can be barriers and challenges to knowledge transfer. One, according to Thompson, is the organizational culture and structure. Do these encourage knowledge transfer? And are time and money being set aside for specific initiatives devoted to transferring knowledge?

"If you're interested in trying to have a more structured knowledge capture and sharing strategy, one solution is to try to get management to buy into a scenario where your prospective retirees are allowed to break away one day a week, allowing them to create some knowledge assets, such as case studies or videotaped assets," suggests Perry. If your company is not interested in doing this, you might consider referring these opportunities to other organizations, such as associations, universities or even consulting firms.

How can you get management buy-in? According to Perry, it would first be useful to try to document the impact of the anticipated retirements and the consequences of migration of knowledge and expertise that this is likely to create. Second, if you have an opportunity, benchmark with companies that are already engaged in successful knowledge transfer strategies, such as mentoring programs. Third, take this information, put it together in a plan, and furnish this to management with some kind of projected return on investment.

Brown agrees with the importance of creating a business culture that values and promotes knowledge transfer. "One thing you really need to put into place is a culture change that values knowledge capturing and sharing," he says. "When I began my career as an engineer, it was quite common for a senior engineer, when you asked him why we'd done something, to respond with, 'Because I said so.'" The reason for this cagey reply, he soon discovered, was that people feared for their jobs, and they didn't want anyone else to know what they knew. "These days, though, you really need a culture that encourages knowledge transfer and knowledge sharing – to make it a part of everything they do," he concludes. ■

About the Author:
William Atkinson is a freelance writer based in Carterville, Ill.

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The Supply Chain Goes Mobile @ IHS

A new marriage of information and technology is driving the next generation of global supply chain visibility and risk mitigation

By Editorial Staff

Ron Crean paints a vision for a brave new world of global supply chain visibility that sounds like a plot device from a big-budget science fiction movie.

Here's Crean's vision: Say you find yourself down on the docks looking for the ship with your company's containers. You pull out your smartphone and fire up a light-weight app that activates the phone's GPS and spatial locating capabilities. You scan the phone about the port, taking in the ships tied up at the dock and those still offshore. As you point the phone at a given ship, the app uses the phone's screen to display the name of the ship, along with a picture that you can match to the vessel in front of you. You continue scanning until – Bingo! – you locate the ship you've been waiting for, and you head off to investigate the status of your long-awaited containers.

Futuristic as this scenario might have sounded even a year ago, today the merger of technology and information required to fulfill this vision has already taken place at IHS Fairplay, where Crean is director of strategic marketing. Fairplay, based in Redhill, Surrey, south of London, has roots stretching back to 1764 as the authoritative publisher of Lloyd's Register of Ships. Today it is the top provider of information and insight to the maritime industry, maintaining databases on ships, real-time and historic vessel movements, owners, managers, casualties, ports and maritime companies, as well as extensive news archives.

Leveraging this wealth of information and the new capabilities enabled through technologies like GPS, "augmented reality" and geospatial information systems, IHS is offering up solutions that are helping to drive the next generation of supply chain visibility and risk mitigation.

The Drive to Visibility

Initiatives to improve global visibility have been a priority for companies looking to mitigate risk and improve the efficiency of their supply chains.

A survey of more than 400 companies by Aberdeen Group for its "Global Supply Chain Benchmark Report" found that the lack of supply chain process visibility is the top concern for 79 percent of large enterprises. In addition, 77 percent of the companies participating in the study cited "supply chain visibility" as a top target for supply chain technology investments. The most commonly cited business pressures driving visibility adoption included the need to improve on-time performance, the need to proactively alert customers of late shipments, and the desire to reduce lead times and lead-time variability.

Yet even as companies recognize the need for increased supply chain visibility, they continue to pursue supply chain strategies that make that visibility more difficult to obtain. In search of lower costs, for example, companies have outsourced production to overseas suppliers, requiring greater reliance on extended supply lines. That means that ever larger shares of a company's assets are in motion at any given time throughout the supply chain.

In a recent study of the pharmaceutical sector, for example, 78 percent of 112 industry executives from pharmaceuticals, medical devices and biotechnology companies surveyed said global sourcing outside of the US will be increasing, while 76 percent said their global manufacturing outside of the US will be increasing. All these forces are driving the industry to develop a supply chain that is more extended, globally dispersed and virtual, according to the report ("Achieving Global Supply Chain Visibility, Control & Collaboration in Life Sciences: Business Imperative, Regulatory Necessity," co-sponsored by consultancy PwC and published by industry analyst firm Axendia).

Meanwhile, the transportation industry and supply chain technology vendors have only recently started to offer solutions that allow customers to track their goods in motion, most typically now through information portals that register significant "events" as a shipment moves along the transportation chain. (Think package tracking capabilities offered by a UPS or FedEx, only applied to containers.) The Axendia study, for instance, found that visibility into the supply chain is primarily based on "snapshots in time" rather than "real-time" information. As a result, the study noted, threats that were considered limited or small scale as few as 10 years ago, such as drug counterfeiting and illegal product diversions, are becoming major concerns, with 44 percent and 35 percent of industry executives, respectively, citing them as business risks in the next five years.

The Worldwide DMV for Ships in the Palm of Your Hand

IHS closes key gaps in the information chain that underlies the global supply chain. The company's Fairplay business traces its origins back to 1883, and its Lloyd's Register of Ships (bought out by IHS in 2009) has continuously published since 1764. The registry now contains information on every ship in service over 100 tons – approximately 175,000 vessels in all, with about 500 fields of information on each ship. "It's basically the industry bible," says Crean. IHS Fairplay also is the sole global issuing authority of IMO ship identification number on behalf of the International Maritime Organization. The seven-digit IMO number uniquely identifies every vessel and is never reassigned to another ship, regardless of transfers of ownership, making IHS, in Crean's words, essentially a Department of Motor Vehicles (DMV) for ships.

In addition, IHS leverages the Automatic Identification System (AIS), a standard established six years ago for transponder-based identification systems mounted on all ships of 300 tons or more, primarily for purposes of collision-avoidance. IHS' AISLive was the first global AIS network to provide an online application with access to real-time ship movements, and the network now offers current position information in more than 2,500 ports and terminals around the world, in over 100 countries, updating the position of all tracked ships within the coverage areas every three minutes on a round-the-clock basis. Accessing the system

through a graphical interface on a PC or laptop, users can drill down to view an individual vessel's details, such as IMO number, Maritime Mobile Service Identity (MMSI) number, latitude, longitude, course, speed and next port.

Crean is enthusiastic in describing IHS' work to bring the maritime industry into the 21st century by leveraging technologies to automate what often are centuries-old workflows. But he is positively energized by the prospects of marrying all the information that IHS is collecting on the movement of ships through the global supply chain with new mobile technologies, including smartphones and devices like Apple's iPad. "The GPS chip in a smartphone pinpoints that device's position," he says, "and we can tell whether you're pointing it at a harbor. We can marry that with the location information on all the ships in our databases. So wherever you point your phone, we can identify the ships you're looking at and provide you with a variety of information on each of those ships in real time." This application employs a solution from IHS called AISLive, which is in use by customers like customs agencies, the Coast Guard, law enforcement agencies and ship agents who want to be able to identify ships. IHS developed an app for the iPad and a platform-agnostic application for Android, Blackberry and other mobile platforms to give these clients untethered access to ship information – useful for ship crews who can't be tethered to a PC or even a laptop.

Maritime Visibility 2.0

From the supply chain perspective, the prospect of marrying this kind of comprehensive information on the movement of goods with other "intelligence" offers up new possibilities for supply chain visibility and risk mitigation. For example, Crean points to the Terrorism Events Spatial Layer offering from IHS Jane's, which displays ongoing global terrorist and counter-terrorist activity around the globe to provide a comprehensive view of risks and trends in terrorism activity in various regions of the world. The layer can be imported into various GIS applications to provide a comprehensive view of terrorist events, and it can be married with Fairplay data on ship locations to understand whether a terrorism-related event will cause a disruption to a supply chain. "Previously you would have had to pull together many different sources of information in order to get this kind of complete picture," says Crean. "But with this kind of layered approach, you can immediately start to build an action plan for how to react to a specific event."

The convergence of all of these data sets, Crean continues, make it possible for companies with global supply chains to begin advancing global location intelligence strategies. For instance, a car manufacturer bringing parts out of Asia could see that a vessel carrying critical components has encountered an interruption in service – say, being hijacked by pirates off the Horn of Africa – well in advance of reports from government sources, suppliers, carriers or the general media. With that kind of advanced warning, the automaker could turn to other suppliers or expedite new shipments in time to head off a disruption in production. "Everything they do will be linked in some way to spatial data so they can give it immediate context," Crean says. "That changes the nature of the way our customers operate." ■

Information Solutions for the Global Supply Chain

IHS Fairplay offers several solutions for tracking movements through the global supply chain:

Sea-web is a maritime reference tool that combines comprehensive ships, companies, shipbuilders, fixtures, casualties, port state control, ISM, real-time positions and historic vessel movements data into a single application. It offers details of more than 180,000 ships of 100 GT and above, including newbuildings and casualties, and it provides up to 500 data fields. A Movements Module provides real-time ship positions, as well historic movements and port callings. iPad and smartphone versions of Sea-web are available, too.

AISLive was the first global AIS (Automatic Identification System) network and continues to provide an online application with access to real-time ship movements. Its growing network coverage extends from Europe to North America, the Caribbean, Mediterranean and Far East, currently providing real-time information in over 100+ countries and over 2,500 ports and terminals around the world. The solution shows the live positions of about 35,000 vessels a day, with each vessel's position displayed on a chart and updated every three minutes, 24/7. Clicking on a vessel yields additional details such as IMO number, MMSID, latitude, longitude, course, speed and next port. Users of AISLive include port authorities, ship agents, brokers, charterers, port service suppliers, ship owners and civil authorities.

LNGLive brings together the resources of IHS Fairplay and energy trading software specialist Innovez Ltd. to provide a state-of-the-art daily reporting service on the global flow of gas. LNGLive offers reports on source and destination of global gas cargoes, ship location, destination, port calling history and movement analysis for the LNG fleet, including terminal type and ship capacity. Advanced predictive algorithms are used to determine port callings that occur even when a ship's AIS transponder is not switched on and to improve the accuracy of crew-entered data.

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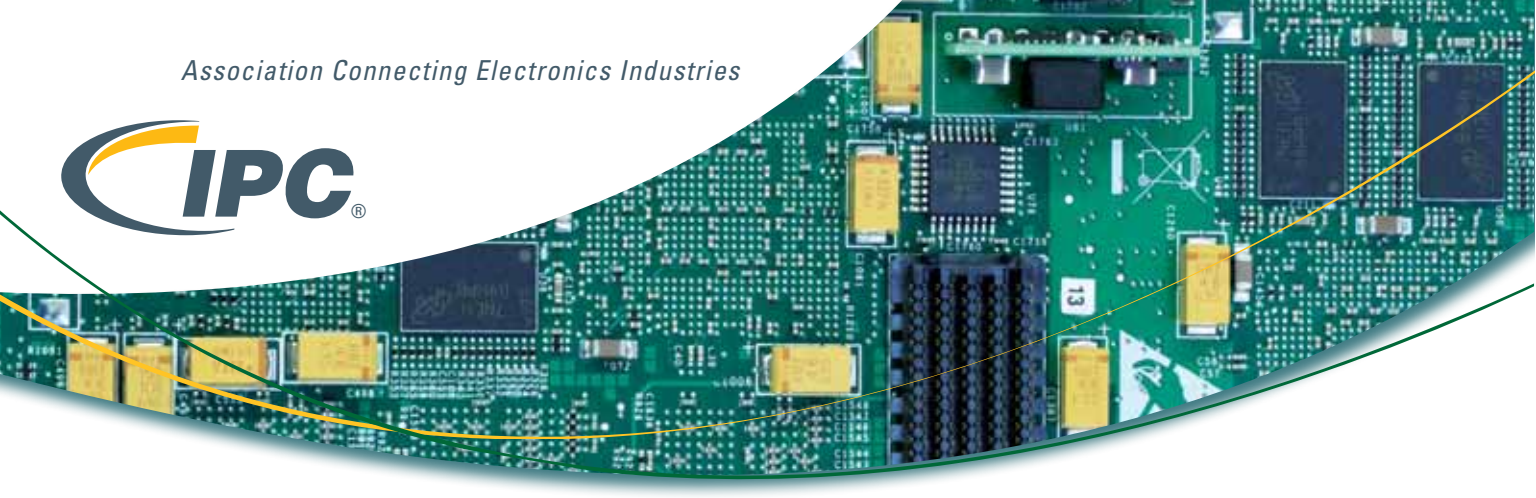

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A Real and Present Danger in the Electronics Supply Chain

From the Editors of Supply & Demand Chain Executive

This magazine has written in the past about the real and present danger of counterfeit and inferior components entering the supply chain, and we have sounded the clarion call regarding the relationship between issues like supply/demand volatility, obsolescence and counterfeits. We have noted industry estimates that, in the electronics supply chain, up to 10 percent of technology products worldwide are counterfeit, equating to roughly $100 billion in global product sales. As a result of the recent economic downturn, the volatility in demand and supply engendered has exacerbated this issue. A recent survey by the Bureau of Industry & Security of the U.S. Department of Commerce points to a growing incidence of counterfeits over the past four years.

Mark Snider has seen the counterfeits problem grow persistently over the course of his 20 years in the electronics industry. Snider comes from the world of independent distributors of electronic parts. He also is the founder of ERAI, a privately held global information services organization that monitors, investigates and reports issues that are affecting the global supply chain of electronics – including counterfeits. ERAI offers in-depth information on counterfeit, substandard and high-risk parts, and its subscribers include original component manufacturers (OCMs), original equipment manufacturers (OEMs), distributors (franchised and independent), contract manufacturers (CMs), government agencies and associations serving the industry.

Snider says that the problem of counterfeits is inherently linked to the ups and downs in the market for electronic components. "There are always peaks and valleys in supply," he notes. That volatility creates challenges for OEMs and contract manufacturers that rely on consistent supplies of parts – when parts are end-of-lifed or are in short supply as a result of high demand, manufacturers frequently turn to independent distributors to obtain the supply they need. "There has to be a source of supply somewhere," Snider says plainly. Unfortunately, Snider continues, buyers under pressure to get parts onto the plant floor on time might not always adhere to commonsense approaches to obtaining components when those parts are in short supply or when time is of the essence. They might simply go to Google, put in a part number and go with the supplier that says he's got the parts, not thinking about whether the parts are legitimate or not.

Standards development and research organization SAE has moved to help companies deal with the challenge of counterfeits through its G-19 Counterfeit Electronic Parts Committee, which includes representatives of each link in the electronics supply chain. The committee developed the SAE AS5553 standard ("Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition"), which aims to arm enterprises with guidelines to help reduce the risks of counterfeits. Additional standards are in the works covering independent distributors and facilities that test parts to determine whether they are counterfeits.

ERAI participates in the G-19 Committee, but Snider notes that enterprises must take a comprehensive approach to counterfeits that includes standards as one component. Senior management at companies affected by counterfeits, he says, must adopt a proactive approach to counterfeits. Leaders in addressing these risks build an internal team to establish and enforce policies around preferred parts and vendor lists, and they provide funding to arm engineers and procurement staff with the tools they need to "scrub" bills of materials through databases offered by organizations like ERAI or companies like IHS, exposing parts at risk for counterfeits or obsolescence – optimally, before a new product BOM is approved and sent to Procurement. Snider also recommends constantly reevaluating the vendor base, paying particular attention in cases when you have to go to the open market. And he notes that senior management must ensure that policies get driven across the company.

Snider says that perhaps the biggest challenge in dealing with counterfeits is getting senior management to grasp the seriousness of the issue and devote resources to addressing it. "They know it's out there, they know it's real, but it might not have affected them, at least on a large scale," he says. "People don't want to be proactive until it bites them, when they've got tens or hundreds of thousands in rework charges because they put some bad parts on a board. There's a lot at stake here, and not just financial aspects, because brand reputation is the biggest concern." ■

More information on ERAI at www.erai.com.

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