White Paper

# Playing With Fire: The 4 Hidden Risks Lurking In Your Supply Chain

Author:
**Michael G Lamoureux, PhD.**

© Sourcing Innovation
Sponsored

Sponsored by

**Modern supply chains are fraught with risk that can result in volatility and increased operational costs, large and sometimes devastating losses, and long term damage to the corporate reputation.**

Of the four major categories of risk, the costs of non-compliance risk is probably the easiest to quantify, and these costs alone should scare you.

For example, consider the recent settlements by Washakie Renewable Energy[1], ExxonMobil[2], and Noble Energy[3] in the United States for $3.0M, $3.19M, and $4.95M for violations of the energy policy, clean water, and clean air acts, respectively as well as the recent $13.2M settlement by Lumber Liquidators[4] for violating the Lacey Act.

One could also consider the recent settlements by Sysco[5] and OtisMed[6] Corporation for violations of the California and Federal Food, Drug, and Cosmetic acts for $19.4M and $80M.

Or, one could consider the headline making settlement by Gibson[7] (Brands Inc.) in 2012 for a violation of the endangered species act. The fine was paltry in comparison to the tarnish it put on the esteemed Gibson brand.

These are just a few examples of large fines that resulted from non-compliance, which is not the only category of risk that a corporation needs to be on top of. The overall risk in a global supply chain is staggering, and the smartest Supply Chain leaders are taking proactive action to mitigate these risks and the million dollar liabilities that accompany them.

They are tackling :

- **Risk of fines from non-compliance (away and at home)**
- **Product cost increases from volatility risk**
- **Revenue loss from supply disruption risk**
- **Value loss from brand risk**

As a result of headline-making supply chain calamities, these risks are quantifiable in terms of fines, revenue losses, and long-term stock price reductions as a result of loss in brand value.

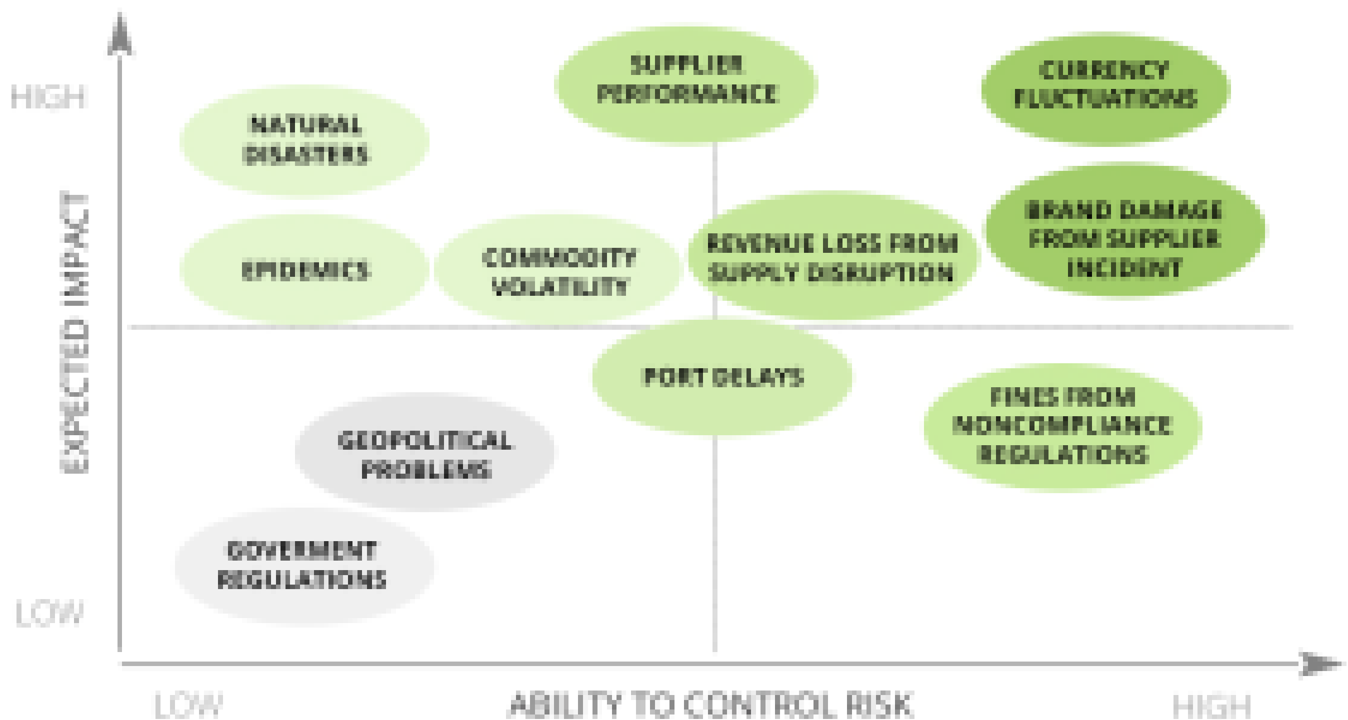
For example, back in 2003 Hendricks & Singhal[8] found that announcements of supply chain problems, on average, decrease shareholder value by 10.28% and a recent study by CIRANO[9] found that there is an 80% chance of a company losing at least 20% of its value at least once during a five year period.

Furthermore, as a result of new and updated national and regional acts and legislation (around the globe) that increase an organization's responsibility for their products, services, supply chain and supplier compliance (e.g. the US FCPA, UK Modern Slavery, France devoir de vigilance, etc.), these risks are just increasing.

The good news is that these risks can be avoided or significantly reduced. How? We'll get to that, but first we have to understand the risks so that you understand not only why the organization needs to take action, but the actions that can be taken.

# Risk of fines from non-compliance

As highlighted in our introduction, the risks of fines from non-compliance is very real and, on average, very costly to an average organization.

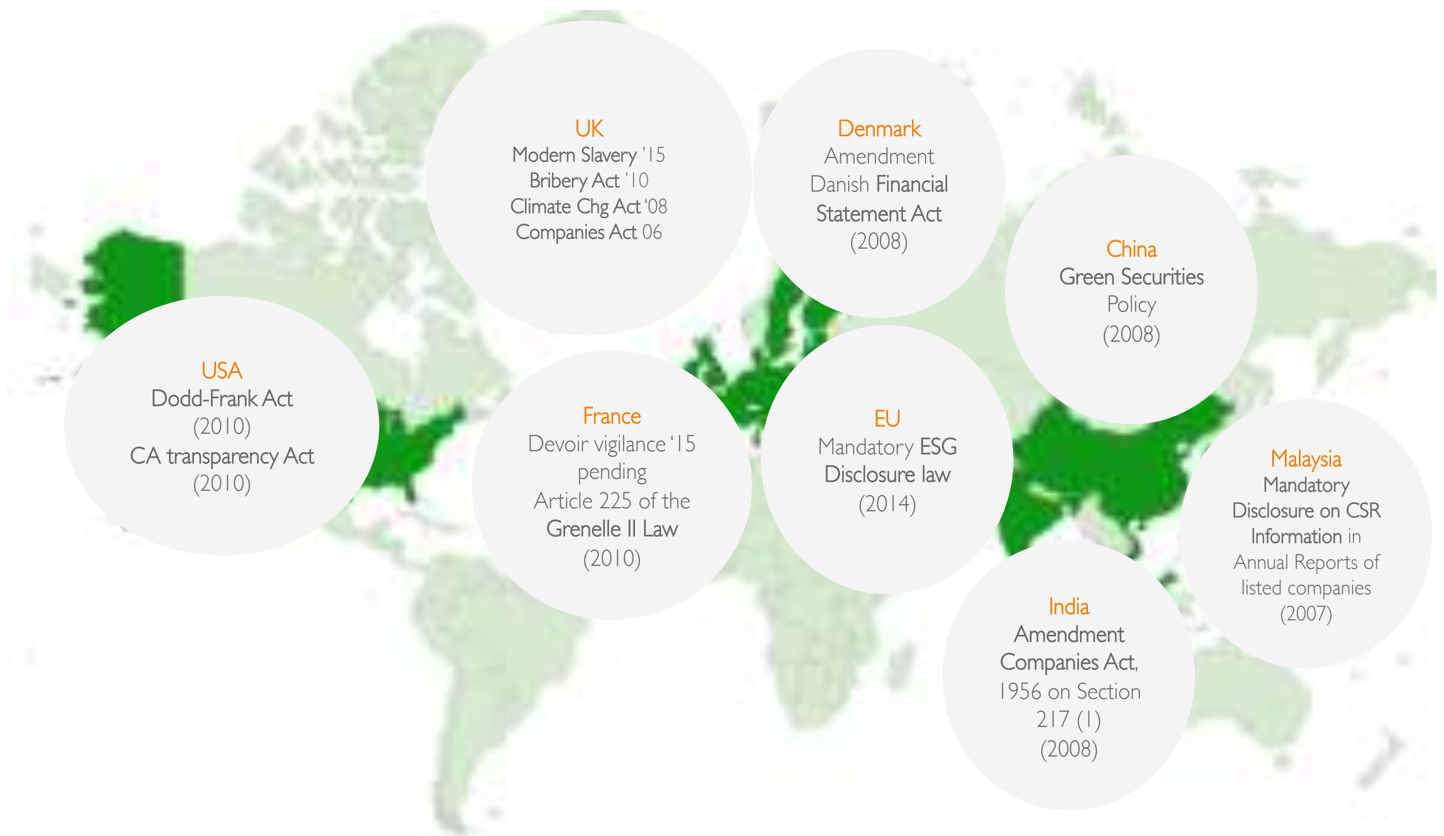



The ever-increasing number of global environmental protection acts, anti-corruption acts, workers' rights and anti- human-trafficking acts alone presents a dizzying array of legislation that is hard for the average compliance professional to even enumerate. In this section we will highlight a few of the more prominent acts and the costs of non-compliance.

## Environmental Acts

In the US, there are the Energy Policy, Clean Water, Clean Air, Hazardous Waste, and Lacey Acts and in the EU there are the WEEE (Waste Electrical and Electronic Equipment), RoHS (Restriction of Hazardous Substances), and REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) Directives.

While the fines and penalties we discussed in our introduction were quite large, they were not as large as some of the fines that have been handed down in the past. In 2013, Wal-Mart[10] had to pay $81.6M in fines for the mishandling of products that became damaged or were returned and became hazardous waste, of which $60M was a result of violations to the Clean Water Act and $14M was a result of Federal Insecticide, Fungicide and Rodenticide (FIFRA) violations. In 2007, RC2 Corp[11]. lost $30M in settlements as a result of lead paint on its Thomas and Friends line of toy trains.




Clean Air violations can get quite high too. Hyundai[12] had to pay a 100M settlement in 2014 as a result of selling approximately 1.2 million cars that emitted around 4.75 million metric tons of greenhouse gases above what the company said the cars would release.

In the EU, a total of £220,000 GBP ($354,266) in fines were levied in 2012 in the UK on eight individuals and three companies in electronic waste trafficking scam as the result of a WEEE export trial[13]. The individuals and companies in question illegally exported 496 tons of scrap televisions, refrigerators, computers and other electronics, to Ghana, Nigeria and Pakistan, all while telling customers the items were being refurbished or recycled responsibly.

This is likely just the first of many fines as the CWIT project[14] last year estimated that of the 9 million tons of electronic waste generated annually in the European Union, only 3 million tons are properly treated and reported. WEEE fines stand to be a huge money maker for the EU, so one can expect an increase in fines in the years ahead.

Moreover, the fines from REACH could dwarf the fines from WEEE in years to come as each individual violation of REACH can cost an organization hundreds of thousands of Euros.

## Anti-Bribery/Corruption

Huge fines don't only result when companies don't properly dispose of their waste or harm the environment, they can also result when corporations violate the US FCPA (Foreign Corrupt Practices Act) and the UK Bribery Act.

In 2014, the US Department of Justice (DOJ) handed out corporate fines for FCPA violations averaging $156.6M per violation[15], including a 772M penalty to Alstom[16], the second largest penalty in history. (The top ten penalties, listed on the FCPA blog[17], average $444M each.)

The FCPA has global reach, and many global corporations have paid the price. As part of its FCPA investigation of Panalpina, a Swiss logistics firm, the SEC and DOJ charged Shell Nigeria Exploration and Production Company Ltd. (SNEPCO)[18], a subsidiary of Royal Dutch Shell PLC, for paying $2M to subcontractors while knowing that some or all of the money would be paid as bribes to Nigerian customs officials to import materials and equipment into Nigeria through Panalpina. The illegal payments were allegedly covered up in SNEPCO's books and records, thus causing falsified entries in Royal Dutch Shell's books and records. To settle the matter, Royal Dutch Shell and SNEPCO agreed to a three-year deferred prosecution agreement and payment of a $30M penalty by SNEPCO.

In addition, Shell International Exploration and Production, Inc. agreed to pay more than $18M in disgorgement in prejudgment interest to the SEC for its failure to prove internal control systems were in place — which resulted in the company paying more than $48M in criminal and civil sanctions.

The UK Bribery act is also showing its teeth. In 2014, the Serious Fraud Office[19] secured its first convictions under the act against Sustainable AgroEnergy Plc., a subsidiary of Sustainable Growth Group, when three individuals associated with the company were found guilty of bribery and fraud and each sentenced to between six and thirteen years. It's important to note that it's not just large corporations or banks that are at risk, but any entity that processes payment transactions.

Last year, the U.S. Treasury Department disclosed a $7.7M settlement with eBay Inc. unit PayPal Inc.[20] over alleged sanctions violations by the electronic payments company for thousands of dollars' worth of transactions involving goods and services going to and from Cuba, Sudan, Iran, and a man allegedly involved in the black market for nuclear-weapons technology.

To cap it off, the recent Volkswagen[21] emissions fraud scandal will cost not only fines, which could be as high as $18 Billion if the company does not sufficiently cooperate with regulators, but a recent report by Credit Suisse[22] estimates the scandal could cost the automaker up to $86 Billion.

Credit: Sergey Starostenko / Shutterstock.com

## Worker's Rights

This includes employment and fair wage regulations, health and safety regulations, child labour laws, and human trafficking (in the supply chain) laws. While most non-major violations of reporting, fair wage, and health and safety laws still carry relatively small fines compared to the environmental and anti-bribery acts, the emerging child labour laws and anti-human trafficking acts could turn out to be even greater. In the US, one of the biggest compliance headaches that has emerged in recent years is the I-9 filing regulation.

For example, an assessment by the Department of Justice, Office of the Chief Administrative Hearing Officer, resulted in an I-9 related penalty of over $228,000 to a Georgia construction company[23] while a U.S. Immigration and Customs Enforcement's Office of Homeland Security Investigations into clothing retailer Abercrombie & Fitch[24] resulted in a $1,047,110 settlement for numerous technology-related deficiencies in the company's electronic I-9 system.

However, the bigger problem is child labor and human slavery in the supply chain, not just because it's morally and ethically wrong, but because a number of jurisdictions are beginning to introduce legislation that would either ban goods, or hold a company responsible if it uses suppliers that employ or themselves use suppliers that employ child labor or slave labor.

For example, the Trade Facilitation and Enforcement Act signed in February, 2016 closes the loophole in the 1930 Tariff Act banning slave-produced goods from entering the United States. Also, California recently passed its Human Trafficking Law (as part of its Transparency in Supply Chains Act).

While there have been no big fines or criminal convictions to date, one can be sure that they are coming as many recent reports show that slave labor is still common in many automotive and electronic supply chains that do not maintain the highest level of vigilance. In addition, the UK just passed the Modern Slavery Act. Under the associated guidance released by the Home Office in November, the fine for failing to respond to an injunction to report as required is "**unlimited**", at the discretion of the judge.

**For example**, on August 19, 2015, a consumer filed a class action lawsuit against Costco Wholesale Corporation[25] and several of its suppliers in the United States District Court for the Northern District of California, asserting that prawns from Southeast Asia that Costco sold to consumers were farmed using forced labor.

# Product cost increases from volatility risk

is increasing, expanding to other markets

Most people associate volatility risk with oil, which hasn't had stable long term pricing in over a decade; metals, such as copper which increased steadily from 2004 to 2006 and stayed at a high until about 2009, when prices dropped 66% back to 2004 levels; and crops, where a major drought, fire, or tsunami can wipe out enough in a single disaster to result in a global shortage and rapid market price increases. But these aren't the only categories

For example, other food commodity markets that were historically stable are also at risk. Even long standing stable markets, such as dairy, which was almost static from its inception in 1991 to 2006, never moving by more than $100 per ton in any week in that timeframe, recorded 32 occurrences of a weekly price jump of more than $100 per ton in the next three and a half years.

And last summer the avian flu outbreak resulted in over 48M chickens and turkeys being wiped out and an egg-shortage throughout the southern US which resulted in the cost of eggs more than doubling. Raw materials can easily jump when a mine has to close, even temporarily.

For example, in 2014, uranium increased 3.2% immediately upon announcement by Cameco Corp.[26] that it would temporarily shut its McArthur River mine. Furthermore, components in short supply can jump when a disaster disrupts production.

For example, on September 4, 2013 a major fire at SK Hynix's[27] Chinese Fab 1 and 2, which serviced over 25% of the DRAM market, damaged equipment and left the plants offline. This resulted in shortages and a sharp uptick in DRAM prices which saw DDR3 cost-per-gigabyte skyrocket to double 2012 rates.

**" ...over 85% of companies had suffered a disruption, and more than 50% of companies had more than one disruption "**

**ZURICH[28]**

# Revenue loss from supply disruption risk

An 85% likelihood within 12 months

Product cost increases from volatility risk is bad, but losses from supply disruptions can be much worse. However, before we discuss the potential magnitude of the loss, it's important to understand the likelihood of a disruption. In 2012, as per a Zurich[28] study, over 85% of companies had suffered a disruption, and more than 50% of companies had more than one disruption, and the numbers have held steady since then. In addition, the number of disasters recorded that resulted from natural hazards was more than twice the average in the preceding decade. And natural disasters are devastating. According to Swiss Re[29], total economic losses from natural disasters in 2011 topped 370 Billion.

To understand how we reach numbers of this magnitude, consider the Thai floods[30] of 2011. A number of automotive companies lost inventories approaching $100M, including Honda that lost $88.3M in inventory, but the camera industry was hit even harder.

As a result of the inventory and production loss, Nike and Cannon collectively lost $1.39 Billion in expected revenue. This is not a typo. Nike and Cannon collectively lost $1.39 Billion.

Moreover, supply disruptions come in many shapes and sizes and are not just limited to natural disasters. In the 10th World Economic Forum Global Risks Report[31], we find 28 economic, environmental, geopolitical, societal and technological risks that can all cause significant disruptions in an organization's supply chain.

All told, while exact numbers are not available, disruptions cost the global economy trillions of dollars each year. And without a change in modus operandi, the situation is only going to get worse given that natural and man-made disasters are expected to increase five-fold in the next fifty years[32].

And some of these disruptions can be just as costly. For example, on June 16, 2009, Genzyme Corporation[33] announced that it had discovered the virus Vesivirus 2117 in one of the bioreactors at its plant in Allston, Massachusetts. Genzyme made the decision to shut down production of the three drugs -- Cerezyme, Fabrazyme and Myozyme -- produced in the plant, expecting the plant to be back up in July. The plant was not operational again until August due to a long processing lead time.

The company's stockpile was not large enough to fully absorb the production loss and the company estimated that the revenue loss associated with the disruption would be in the range of $250/$600M.

The reality is that disruptions decrease sales by an average of 7%, decrease shareholder value by an average of 7% to 10% (as first studied by Hendricks & Singhal[8] in 2003 and again by Accenture[34] and the World Economic Forum in 2013), and decrease the share price by an average of 25%, which typically doesn't bounce back for two years.

# Value loss from brand risk

" ...there is an 80% chance of a company losing at least 20% of it's value at least once dureing a five year period " CIRANO[9]

Volatility loss is costly, disruption risk is costlier, and compliance risk can be extremely costly, but even nine-figure non-compliance fines can be dwarfed by the value loss from brand risk. A recent study by CIRANO[9] found that while there is an 80% chance of a company losing at least 20% of its value at least once during a five year period, a major incident that negatively impacts the brand in a significant way can be much worse. Consider what happened to BP[35] as a result of the Gulf of Mexico oil spill when the Deepwater Horizon drilling rig exploded on April 20, 2010. It's stock price fell by 52% in 50 days. Ouch!

Similarly, when Airbus[36] announced after trading closed on June 13, 2006 that issues with the supply and installation of electrical harnesses would lead to a further six-month delay in the delivery of the A380, and that the impact of the disruption on earnings before interest and tax would be €500M per year for four years, the value of its stock plummeted by over 26% the next day, equivalent to a market capitalization loss of approximately €5.4 Billion.

# The challenge of reducing risk and lessening loss and the opportunity for proactive mitigation

Risk is increasing and the losses are mounting. Given that one cannot predict environmental disasters, pandemics, or even man-made disasters outside of the organization's control, is there anything an organization can do to prevent the losses described in this paper?

For example, while one cannot prevent metal price spikes due to mine collapse, crop price spikes due to drought and fire, and inventory losses due to tsunamis and floods, one can monitor for the occurrence of these events and act fast, putting into effect previously prepared continuity plans.

**Proper monitoring can detect risk** indicators as soon as they materialize and **allow an organization to react appropriately to prevent, or at least minimize, loss.**

However, that's a reactive, and not a proactive, approach. In order to truly minimize risk of product cost increases from volatility risk or disruption, one needs to insure that the organization is not dependent on suppliers or products that put it at unnecessary risk.

This starts by insuring that each supplier and product the organization is dependent on is not at unnecessary risk of regulatory disruption. Suppliers that have violated, or are being investigated for, any of the regulations described in this paper could put the supply chain at risk if their products are seized by authorities, impending fines put them at risk of financial instability, or their failure to respect workers' rights put your organization at risk of lawsuits under supply chain vigilance or anti-human trafficking legislation.

**There's no substitute for good supplier screening.**

For example, failure to adequately monitor suppliers for the quality control procedures necessary to insure a safe supply chain can considerably increase raw material cost if the organization selects food suppliers with less than adequate quality control procedures. If production falls because herds have to be slaughtered (due to out of control mad cow disease) or farmers didn't prepare well for droughts and more cows have to held back for breeding, beef prices can rise 20% or more.

Similarly, failure to properly monitor supply chains sufficiently to insure that there is no BPA, Bisphenol A, in the plastic, diethylene glycol in the toothpaste, or lead in the paint cannot only result in product seizures, forced recalls, and multi-million dollar fines, but also class action lawsuits that can cost ten times that amount.

The reality is thus: while one can't control nature, accidents, or politicians, one can control which suppliers the organization works with and, more importantly, which regulations are monitored against.

For example, if the organization is not fully aware of all of the respective regulations and fully in compliance, the organization can find itself in the same situation that Sony[37] did in 2001 when Sony lost $150M in sales and product reformulation when Dutch authorities halted a shipment of 1.3M Sony PlayStations due to illegally high cadmium levels.

The good news is that except for losses caused by unpredictable natural disasters, every other risk and loss described in this paper can be mitigated through proper supplier screening and monitoring.

Conducting a thorough supplier review will provide an understanding of how mature and well-equipped suppliers are to handle all relevant sustainability, ethical, environmental, trade, workers' rights, and industry standard quality control legislation. It will also identify how well suppliers perform relative to industry standard operating policies, provided that the review effort is not siloed, as will be addressed in our next paper on Why Sustainable Supply Risk Management Cannot Be Siloed.

Once at risk suppliers are identified, the organization can decide how to develop those suppliers, or, if necessary, cut them from the supply chain.

EcoVadis has sponsored this paper from Sourcing Innovation, as part of a series. The next two papers are :

" Why sustainable supply risk management cannot be siloed: lessons from leaders who beat the odds "

Learn more...

" 5 key questions to ask when selecting a supplier sustainability monitoring solution "

Learn more...

# Bibliography

1) ***Washakie Renewable Energy, LLC Clean Air Act Settlement,***
United States Environmental Protection Agency, March 19, 2015
http://www.epa.gov/enforcement/washakie-renewable-energy-llc-clean-air-act-settlement

2) ***ExxonMobil Mayflower Clean Water Settlement,***
United States Environmental Protection Agency, April 22, 2015
http://www.epa.gov/enforcement/exxonmobil-mayflower-clean-water-settlement

3) ***Noble Energy, Inc. Settlement***
United States Environmental Protection Agency, April 22, 2015
http://www.epa.gov/enforcement/noble-energy-inc-settlement

4) ***Lumber Liquidators pleads guilty to Lacey Act violations***
Tomi Kilgore, MarketWatch, October 22, 2015
http://www.marketwatch.com/story/lumber-liquidators-pleads-guilty-to-lacey-act-violations- 2015-10-22

5) ***Sysco Agrees to Pay $19.4M to Settle California Enforcement Challenging the Company's Food Safety Practices and Related Public Statements***
Crystal Skelton and Sarah Roller, Food and Drug Law Access, July 23, 2014
http://www.fooddruglaw.com/2014/07/23/sysco-agrees-to-pay-19-4m-to-settle-california- enforcement-challenging-the-companys-food-safety-practices-and-related-public-statements/

6) ***OtisMed Corporation and Former CEO Plead Guilty to Distributing FDA-Rejected Cutting Guides for Knee Replacement Surgeries***
The United States Department of Justice, December 8, 2014
http://www.justice.gov/opa/pr/otismed-corporation-and-former-ceo-plead-guilty-distributing-fda- rejected-cutting-guides-knee

7) ***Gibson Guitar agrees to pay $300,000 penalty to settle Lacey Act violations***
Pete Kasperowicz, The Hill, August 6, 2012
http://thehill.com/blogs/floor-action/house/242357-gibson-guitar-agrees-to-pay-300000-to- settle-lacey-act-violations

8) ***An Empirical Analysis of the Effect of Supply Chain Disruptions on Long-run Stock Price Performance and Equity Risk of the Firm***
Kendricks & Singhal, November 2003
https://questrompublish.bu.edu/ren/Seminar/Vinod%20Singhal/hendricks- singhal%20glitches%20long-term%20stock1.pdf

9) ***Corporate Reputation: Is Your Most Strategic Asset at Risk?***
Nathalie de Marcellis-Warin & Servan Teodoresco, CIRANO, ISSN 1701-9990, 2012
http://www.cirano.qc.ca/pdf/publication/2012RB-01.pdf

10) ***Wal-Mart slapped with US$81-million in fines for illegally dumping hazardous waste***
Paul Elias and Greg Risling, Financial Post, May 29, 2013
http://business.financialpost.com/news/retail-marketing/wal-mart-fine-hazardous-2013

11) ***$30M Thomas Settlement Nears End Of The Track***
Shannon Henson, Law 360, May 8, 2008
http://www.law360.com/articles/55574/30m-thomas-settlement-nears-end-of-the-track

12) ***Hyundai and Kia fined $100m for misleading customers on fuel economy***
Suzanne Goldenberg, The Guardian, November 3, 2014
http://www.theguardian.com/business/2014/nov/03/hyundai-and-kia-fined-100m-for-misleading- customers-on-fuel-economy

13) ***Penalties handed down in WEEE export trial***
Editorial Staff, Resource Recycling, 2015
http://resource-recycling.com/node/3325

14) ***Towards a better understanding of the illicit trade in electronic waste***
CWIT Project, October 17, 2014
http://www.cwitproject.eu/cwit-workshop/

15) ***The 2014 FCPA Enforcement Index***
Richard L. Cassin, January 5, 2015
http://www.fcpablog.com/blog/2015/1/5/the-2014-fcpa-enforcement-index.html

16) ***Alstom Pleads Guilty and Agrees to Pay $772 Million Criminal Penalty to Resolve Foreign Bribery Charges***
The United States Department of Justice, December 22, 2014
http://www.justice.gov/opa/pr/alstom-pleads-guilty-and-agrees-pay-772-million-criminal-penalty- resolve-foreign-bribery

17) ***With Alstom, three French companies are now in the FCPA top ten***
Richard L. Cassin, December 23, 2014
http://www.fcpablog.com/blog/2014/12/23/with-alstom-three-french-companies-are-now-in-the- fcpa-top-t.html

18) ***Oil Services Companies and a Freight Forwarding Company Agree to Resolve Foreign Bribery Investigations and to Pay More Than $156 Million in Criminal Penalties***
The United States Department of Justice, November 4, 2010
http://www.justice.gov/opa/pr/oil-services-companies-and-freight-forwarding-company-agree- resolve-foreign-bribery

19) ***City directors convicted in £23m Green biofuel trial***
The (UK) Serious Fraud Office, December 5, 2014
http://www.sfo.gov.uk/press-room/latest-press-releases/press-releases-2014/city-directors- convicted-in-23m-green-bio-fuel-trial.aspx

20) ***PayPal to Pay $7.7M To Settle Sanctions Violations***
Jonathan Randles, Law360, March 25, 2015
http://www.law360.com/articles/635728/paypal-to-to-pay-7-7m-to-settle-sanctions-violations

21) ***What we know: the Volkswagen emissions test fraud scandal***
Frank Jordans, Global News, September 26, 2015
http://globalnews.ca/news/2243038/what-we-know-the-volkswagen-emissions-test-fraud- scandal/

22) ***Volkswagen emissions scandal could cost $86 billion, report says***
Chris Paukert, c|Net, October 2, 2015
http://www.cnet.com/news/report-vw-scandal-could-cost-more-than-bps-deepwater-horizon-spill/

23) ***Georgia Construction Company Hit with $228,000 I-9 Penalty***
Bruce Buchanan, LawLogix, April 17, 2014
http://www.lawlogix.com/blog/georgia-construction-company-hit-228000-i9-penalty

24) ***The $1 million mistake: Abercrombie & Fitch to pay for electronic I-9 system deficiencies***
John Fay, LawLogix, September 28, 2010
http://www.lawlogix.com/blog/1-million-mistake-abercrombie-fitch-pay-electronic-i-9-system- deficiencies

25) ***Costco faces lawsuit over sale of prawns allegedly farmed by slave labor***
Samantha Masunaga, The Los Angeles Times, August 20, 2015
http://www.latimes.com/business/la-fi-costco-prawns-20150820-story.html

26) ***Cameco mine shutdown spurs biggest rise in uranium price in 2 1/2 years***
Christopher Donville, The Globe and Mail, August 28, 2014
http://www.theglobeandmail.com/globe-investor/cameco-mine-shutdown-spurs-biggest-rise-in- uranium-price-in-2-12-years/article20234894/

27) ***Here's Why DRAM Prices Will Decline In The Future***
Trefis Team, May 2, 2014
http://www.trefis.com/stock/mu/articles/237647/maryheres-why-dram-prices-will-decline-in-the- future/2014-05-02

28) ***The Weakest Link***
UK Plc's Supply Chain; Zurich, July, 2012
https://www.zurich.co.uk/internet/home/sitecollectiondocuments/business/largebusinesses/zurich _supplychainreport_july2012.pdf

***Strategic Risk: Do Not Forget Your Supply Chain***
Zurich, 2014
http://knowledge.zurich.com/supply-chain/strategic-risk-do-not-forget-your-supply-chain/

29) ***Supply Chain Resiliency: How Prepared is Your Organization?***
Marsh, April 2012
http://deutschland.marsh.com/Portals/32/Documents/120423_Report_SupplyChainResiliency.pdf

30) ***Market Insights from the world of Lloyd's***
Spring 2013
http://www.lloyds.com/~/media/files/news%20and%20insight/market%20magazine/2013/marke t_issue_spring2013.pdf

31) ***Global Risks 2015, 10th Edition***
World Economic Forum, Geneva
http://www3.weforum.org/docs/WEF_Global_Risks_2015_Report15.pdf

32) ***Combating Supply Chain Disruptions: Lessons Learned from Japan***
THINK Executive, Nov 2011
http://www.go2uti.com/documents/10157/100902/TheLogisticsInstituteAsiaPacific- CombatingSupplyChainDisruptions-WhitePaper.pdf

33) ***Operational Strategies for Managing Supply Chain Disruption Risk***
Brian Tomlin and Yimin Wang, published in
Handbook of Integrated Risk Management in Global Supply Chains, Edited by Panos Kouvelis, Lingxiu Dong, Onur Boyabatli, Rong Li, 2012
https://books.google.ca/books?id=fi5LI-L- FN0C&pg=PT83&lpg=PT83&dq=June+16,+2009,+Genzyme+Corporation+vesivirus+2117+reven ue+loss+disruption&source=bl&ots=xGbfS8PxAa&sig=peTMHhopb7X0aaQqOYNmtuqbjYk&hl=en& sa=X&ved=0ahUKEwiw8djdy9TJAhXj44MKHQDDAVMQ6AEIGzAA

***Genzyme Halts Production At Mass. Plant Over Virus***
Jocelyn Allison, Law360, June 16, 2009
http://www.law360.com/articles/106663/genzyme-halts-production-at-mass-plant-over-virus

34) ***Building Resilience in Supply Chains***
Accenture and the World Economic Forum, 2013
http://www3.weforum.org/docs/WEF_RRN_MO_BuildingResilienceSupplyChains_Report_2013

35) ***BP lost 55% shareholder value after the Deepwater Horizon incident***
Alex Chamberlin, Market Realist, April 20, 2010
http://marketrealist.com/2014/09/bp-lost-55-shareholder-value-deepwater-horizon-incident/

36) ***When Supply Chain Disruptions Matter***
William Schmidt, Ananth Raman, Harvard Business School Working Paper 13-006, January 3, 2012
http://www.hbs.edu/faculty/Pages/download.aspx?name=13-006.pdf

37) ***Dutch officials seize cadmium-packed PlayStation kit***
Tony Smith, The Register, December 5, 2001
http://www.theregister.co.uk/2001/12/05/dutch_officials_seize_cadmiumpacked_playstation/

***Europe's Push for Less-Toxic Tech***
Bloomberg Business, August 8, 2005
http://www.bloomberg.com/bw/stories/2005-08-08/europes-push-for-less-toxic-tech

**Author:**
Michael G Lamoureux, PhD.
( c ) Sourcing Innovation

**White paper sponsor:**

## EcoVadis

www.ecovadis.com

EcoVadis is the first collaborative platform providing sustainability ratings and performance improvement tools for global supply chains. EcoVadis' easy-to-use CSR scorecards help companies to monitor environmental, ethical, and social practices in their value chain across 150 purchasing categories and 110 countries.

Over 130 industry leaders such as Verizon, Merck, Coca Cola Enterprises, Heineken, Johnson & Johnson, Renault-Nissan, ING Bank, and Nokia use EcoVadis to reduce risk, drive innovation and foster transparency and trust among over 25,000 trading partners.