The path to supply chain transparency

A practical guide to defining, understanding, and building supply chain transparency in a global economy

About the author

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Acknowledgements

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Introduction

IN 1904, Upton Sinclair spent two months in Chicago's "Packingtown" uncovering horrific details about the meat-packing industry, which he portrayed in the classic book *The Jungle*. Public outrage over *The Jungle* prompted two new laws—the Food and Drug Act[1] and the Meat Inspection Act[2]—that became early drivers of supply chain transparency in the United States.

More than a century later, companies continue to face scrutiny of their supply chain practices, including workers' rights, product safety and integrity, and environmental responsibility. Evidence of this scrutiny in recent years is visible through a number of high-profile global events. Brands have been exposed. Coalitions have formed. And more stringent laws have been passed.[3]

Yet many companies struggle to achieve supply chain transparency. A recent study conducted at Stanford's Graduate School of Business revealed that while most respondent companies have social and environmental systems in place for internal operations, less than a third have similar structures to monitor the practices of their immediate and extended supplier network.[4]

The dispersed nature of today's supply chains creates increasing levels of risk for multinational businesses, making transparency both critical and complex. Without effective visibility into their supply chains, executives potentially have a significant blind spot in their enterprise risk management structure, from which substantial legal, financial, and reputational exposure could emerge.

Supply chain transparency isn't easily achieved; it requires a solid foundation and continuous improvement over time. This article presents a practical four-step approach that companies can take to begin the process of building a transparent supply chain in the current global environment.

Why transparency is an imperative

Transparency goes beyond gaining visibility into the extended supply chain. It is the process by which a company takes action on the insights gained through greater visibility in order to manage risks more effectively.

IN the past, considerable physical and temporal distance separated a supply chain's upstream activities from the manufacturer and its downstream stakeholders. Now, the proliferation of technology, especially mobile devices, and the pervasive use of social media have brought upstream risks much closer to the eyes, ears, and voices of downstream stakeholders, including consumers, business customers, news media, regulatory agencies, and nongovernmental organizations.

At the same time, supply chain risks grow significantly as supply chains span more legal jurisdictions, different types of business practices, and widely varying cultural norms. In this context, transparency becomes the vital process of managing risks by accessing, learning from, and acting on supply chain information. By itself, transparency is an increasingly important capability for companies. But as part of a company's broader attempts to build supply chain resilience—the ability to recover from and reduce the impact of key risk events[5] —transparency's role is pivotal.

A four-step process for building transparency

EVEN supply chain executives who understand the importance of transparency may struggle to prioritize activities and build a transparency process. For companies with traditional or non-traditional supply chains (see sidebar, "Risk and transparency in a non-traditional supply chain"), creating a high-level road map may help. A company can begin by identifying, prioritizing, and visualizing potential supply chain risks; then, it can use "transparency levers" to bridge information gaps; finally, it can move on to managing the insights gained from the process and monitoring the supply chain for additional insights going forward.

RISK AND TRANSPARENCY IN A NON-TRADITIONAL SUPPLY CHAIN

A major hotel company, home to several brands and thousands of properties around the world, was concerned about potential supply chain vulnerabilities. Yet executives were unsure about how to prioritize areas requiring improved transparency. The company followed a four-step process to transparency:

- **Identifying and prioritizing risks.** Given the company's global presence and the nature of the hospitality industry, the transparency team prioritized two sets of risks—one by product category (for example, food, beverages, and linens) and the other by overall risk within the supply chain organization (for example, monitoring adherence to policies and combating fraud).[6]

- **Visualizing risks.** Because the company was concerned about product category and cross-product category supply chain risks, the transparency team chose to map the organization's broader supply chain before drilling into individual product categories. After mapping key players and information gaps, the procurement team emerged as an important gatekeeper that could build added visibility and flag risks within the company's supply base. Effectively, the procurement team became the critical node to manage both product category risks and supply chain risks.

- **Using transparency levers to close information gaps.** Focusing on the central procurement organization, the transparency team refined criteria and processes relating to supplier due diligence and ongoing assessments. The company already followed a supplier due diligence process, but the lessons learned had not historically been used to provide visibility into ongoing supplier assessments. To build transparency, the team implemented a tool that integrated supplier data, categorized suppliers into lower-, medium-, and higher-risk areas, and allowed the team to better manage potential risks with the company's key suppliers.

- **Managing and monitoring.** Implementing the risk management tool was an important step, but the team also outlined high-quality code of conduct standards and created a performance improvement plan to facilitate collaboration with higher-risk suppliers and to mitigate risks.

Through this process, uncertainty in the company's supply chain was addressed with a prioritized set of focus areas, a risk management tool, and a targeted action plan. While eliminating risk is a near-impossible task, building transparency and the tools to manage the resulting information are efficient ways to focus resources and build a more resilient supply chain organization.

Step 1: Identifying and prioritizing risks

It's easy to become overwhelmed by the sheer number of risks inherent in most supply chains today, given the number of locations from which companies source materials, geographies where they have manufacturing operations, and routes they travel to market. So an important first step is to determine which risks to focus on. A comprehensive list of supply chain risks is a good starting point; from there, companies can create a short list focusing on their specific high-priority areas. A scoring process based on the Failure Modes and Effects Analysis[7] can help make this process manageable.

Supply chain risks, such as political instability in the region of supply or lack of environmental compliance by the supplier, can be grouped into four broad categories: macroeconomic, extended value chain, operational, and functional.[8] The Failure Modes and Effects Analysis can be used to review potential risks from each category and zero in on those that are highest priority. Scoring and ranking includes possible severity of the risk, likelihood of occurrence, frequency of occurrence, and ease of detection if the risk does occur (see figure 1).

An example of a high-priority risk in a traditional supply chain might be a costly component that is necessary for the assembly of a product in a manufacturing plant in the United States. That component may be manufactured in several other countries with known labor issues. Looking at the sourcing process from a transparency perspective and using the Failure Modes and Effects Analysis, the risks associated with this component could have a costly impact on the company (severity), create brand issues related to labor (likelihood), occur in every piece (frequency), and be difficult to distinguish from lower-risk parts (ease of detection).

Step 2: Visualizing risks

Once potential risks have been identified and prioritized, a productive next step is to map the volume of products a company has flowing around the world using tools such as Google Earth or 3D mapping (figure 2). The

Figure 1. Scoring and ranking risks

Risk level 0	Risk level 1	Risk level 2	Severity of effect (a)	Likelihood of occurrence (b)	Ability to detect (c)	Total score (a x b x c)
Cross-functional	Legal	Failure to comply with labor regulations	9	8	7	504
Extended value chain	Supply	Supplier-specific adverse social/environmental responsibility event	6	7	9	378
Macro	Geopolitical	Coruption by government official	9	6	6	324
Cross-functional	Hazards	Product malfunction causing harm	8	6	5	240
Operational	Source	Employee fails to follow safety procedure	6	6	6	216
Operational	Source	Company technology/asset fails to enable process	5	3	4	60

☐ 1st priority ☐ 2nd priority Low 1 ▬▬▬ 10 High

Source: Illustrative sample from Deloitte's database of supply chain risks

Figure 2. Visualizing flow of product using 3D mapping
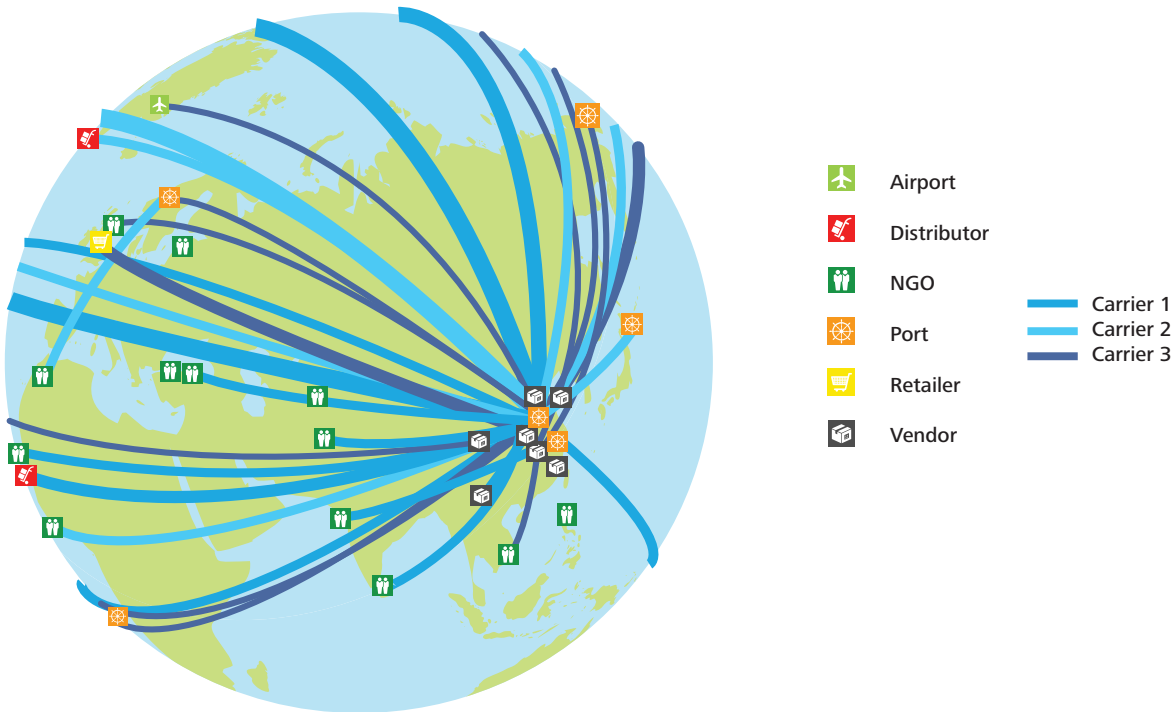
Graphic: Deloitte University Press | DUPress.com

lines used to depict those flows vary in thickness to show the relative volume of product flows. This type of visual representation reveals points of vulnerability where large volumes of products flow from particular suppliers into high-risk regions—a new and compelling way to visualize a supply chain and see potential risks that might not have been apparent otherwise.[9]

The transparency mapping process involves identifying and mapping the suppliers and business partners for a product or products, isolating where visibility is most limited ("information gaps"), and determining who might be able to help close those information gaps.

A large adult-beverage manufacturer engaged suppliers and mapped the location of facilities within its supply chain as well as water risk by region (see figure 3). In this way, the company was able to visualize locations that were currently, or would be in the near future, at higher risk due to water scarcity, which could potentially increase costs or disrupt supply. Similar analyses were also performed with

location data for other important metrics such as energy costs or deforestation.[10]

Step 3: Using transparency levers to close information gaps

After prioritizing potential risk areas and highlighting information gaps, companies can use a number of transparency levers to help close those gaps (see figure 4). For example, an increasingly common method for capturing up-to-date and honest feedback from suppliers is the use of anonymous short messaging service (SMS) text surveys and feedback mechanisms. Companies have found that this is a more comfortable option for company employees and employees of suppliers to raise grievances or share feedback, compared to using a hotline or voicing concerns in person during an audit.
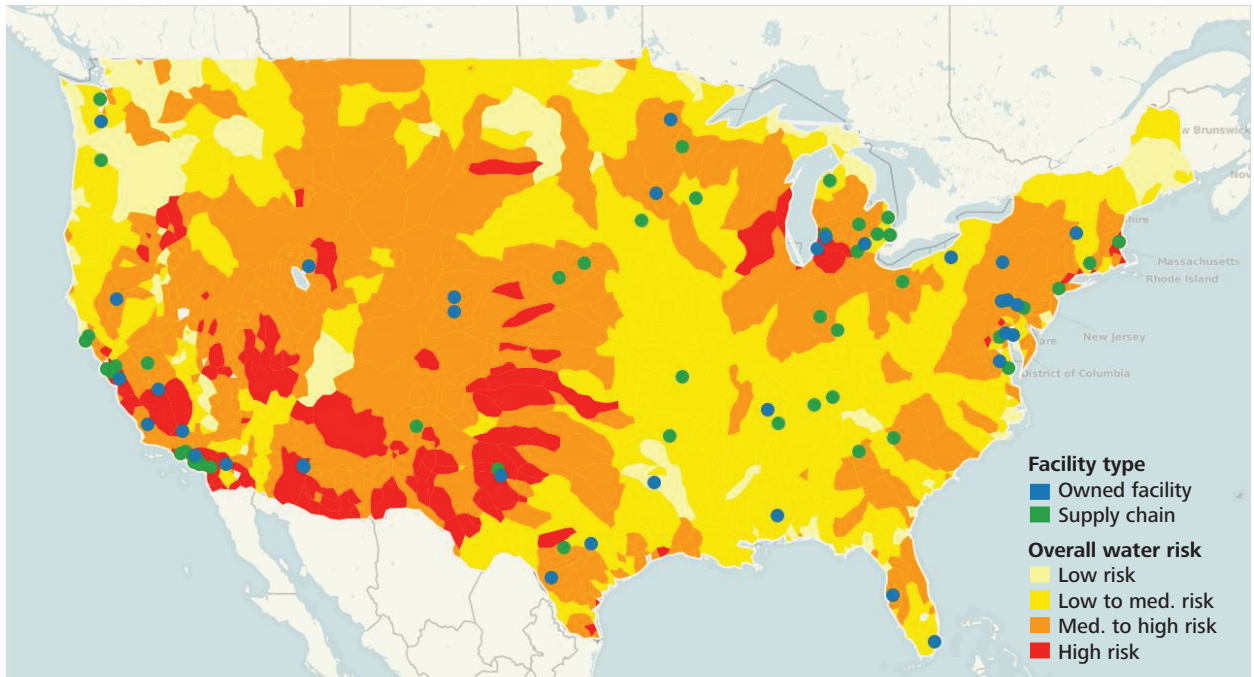
A large retailer conducted an exercise to increase the transparency and resilience of its supply chain. The results revealed a number of priority risks and associated information gaps. One of the risks, verification of legal sourcing of virgin fiber for paper-based products,

occurred several tiers upstream in the company's supply chain (see figure 5, step 1). This risk surfaced because of concerns about both regulatory compliance and potential reputational issues. Specifically, the company discovered that it would have trouble complying with reporting requirements of the US Lacey Act of 1900, such as providing adequate details about
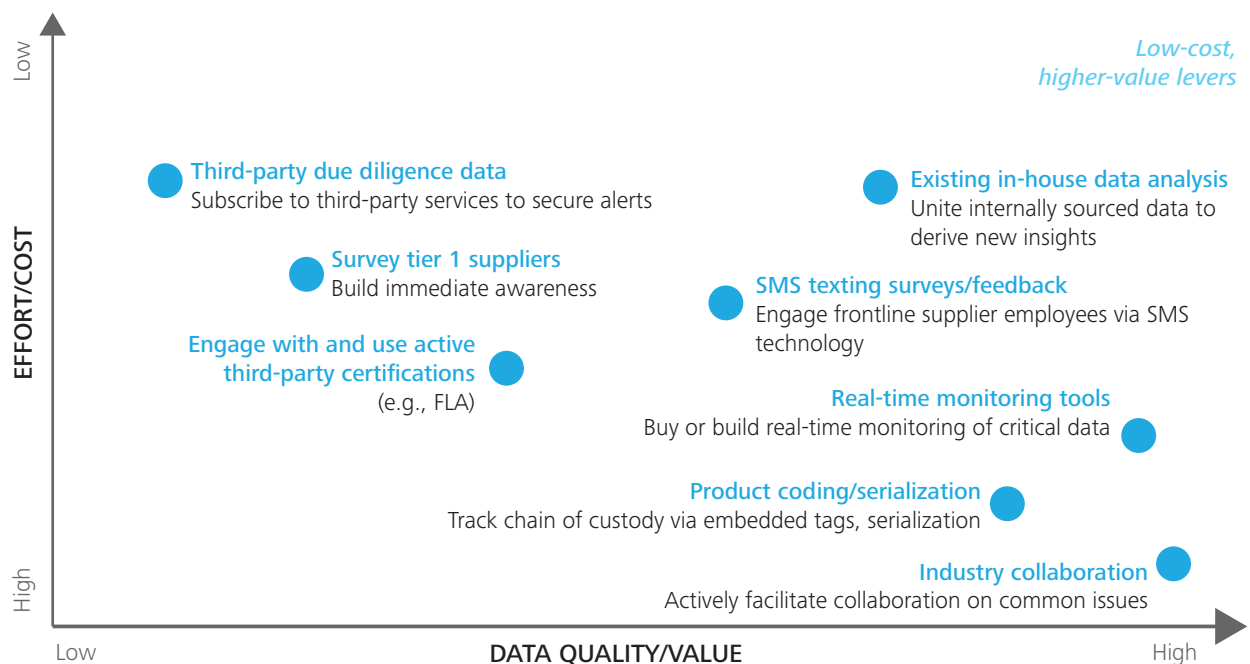
Figure 3. Visualizing supply chain locations and water scarcity risk

Facility type
- Owned facility
- Supply chain

Overall water risk
- Low risk
- Low to med. risk
- Med. to high risk
- High risk

Source: Deloitte LLP.

Graphic: Deloitte University Press | DUPress.com

Figure 4. Representative transparency levers

Low-cost, higher-value levers

EFFORT/COST (Low / High)

DATA QUALITY/VALUE (Low / High)

Third-party due diligence data
Subscribe to third-party services to secure alerts

Existing in-house data analysis
Unite internally sourced data to derive new insights

Survey tier 1 suppliers
Build immediate awareness

SMS texting surveys/feedback
Engage frontline supplier employees via SMS technology

Engage with and use active third-party certifications
(e.g., FLA)

Real-time monitoring tools
Buy or build real-time monitoring of critical data

Product coding/serialization
Track chain of custody via embedded tags, serialization

Industry collaboration
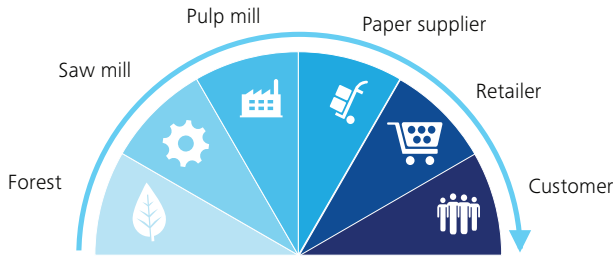Actively facilitate collaboration on common issues

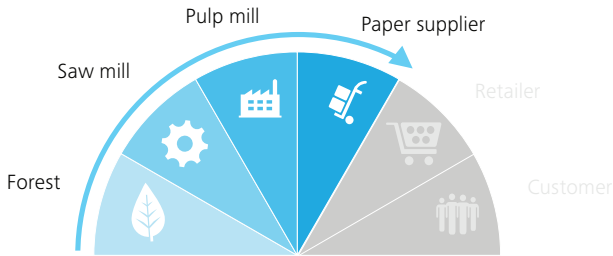Graphic: Deloitte University Press | DUPress.com

Figure 5. A global retailer's approach to supply chain transparency for fiber-based products

STEP 1: Identified risk of purchasing illegally sourced fibers, potentially resulting in legal liability and brand damage
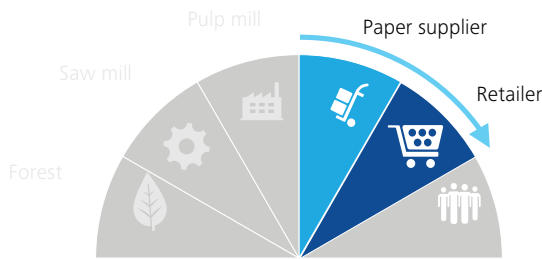
STEP 2: Visualized entire value chain to identify and prioritize transparency gaps

STEP 3: Closed priority information gaps through active third-party cerfication data

STEP 4: Began actively monitoring suppliers with new transparency data and approaches

Graphic: Deloitte University Press | DUPress.com

for 15 percent of greenhouse gas emissions from forest loss.[11]

As the retailer mapped its value chain (figure 5, step 2), it identified an important information gap involving the lack of certification or verification methods to validate the true source of paper products. The company then determined that the transparency lever to close the gap was to develop and implement leading-practice certification standards with major paper suppliers (figure 5, step 3). This lever helped to mitigate risk in two ways: The retailer's action compelled its major suppliers, which were also internationally known brands, to enhance their supplier scrutiny; and the retailer engaged nonprofits working in the affected areas to validate that the new certification standards were being met.

The company's actions illustrate how transparency levers such as certification standards can reduce risks and create value for both the manufacturer and suppliers two and three tiers upstream.[12]

Step 4: Managing and monitoring

Closing information gaps is foundational to transparency, but a sustainable transparency program goes further by helping a company learn from and manage the insights gained from that newfound information. Once a company settles on its approach to building a transparent supply chain, it is important to track and manage the resulting information. A practical way to do this is through a spreadsheet that serves as a supplier database containing different compliance and risk data such as audit history, total spend, and geographic location. Adding basic algorithms to sort suppliers into high-, medium-, and low-risk tiers can help with the prioritization, management, and enactment of corrective action plans (CAPs). A more sophisticated enterprise-wide system might integrate real-time, macroeconomic risk indicators, supply chain visualization tools, and predictive analytics capabilities. Regardless of sophistication, insights from transparency

species of fibers and countries of origin. Not only could noncompliance have potential legal and financial ramifications, but heightened public scrutiny of paper-based product sourcing could expose the company to substantial brand risk if it was found to be sourcing paper fibers from Brazil or Indonesia, which account

most effectively contribute to supply chain resilience if the information is appropriately managed, monitored, and, above all, used.

A multinational heavy equipment manufacturer discovered through a transparency analysis that its key supplier had recently experienced four fires in its factories over a three-month period. The fires impacted parts availability for the manufacturer's production processes, besides creating potential safety, legal, and brand issues. Similar risk events could have been impacting the company for years, as there were more than 30 ERP and manufacturing resource planning (MRP) systems in place with limited integration. Once those information gaps were identified, the manufacturer worked with suppliers and third parties to close them through better information-sharing, as well as by drawing upon third-party monitoring tools that monitor emergency broadband services and can notify the manufacturer immediately of a fire at one of its supplier locations. What used to take three weeks in terms of diagnosing and uncovering the source of potential supply disruptions now requires less than 30 minutes, allowing the company to rapidly adjust its supply plans without risking a disruption in the delivery of equipment to its customers.[13]
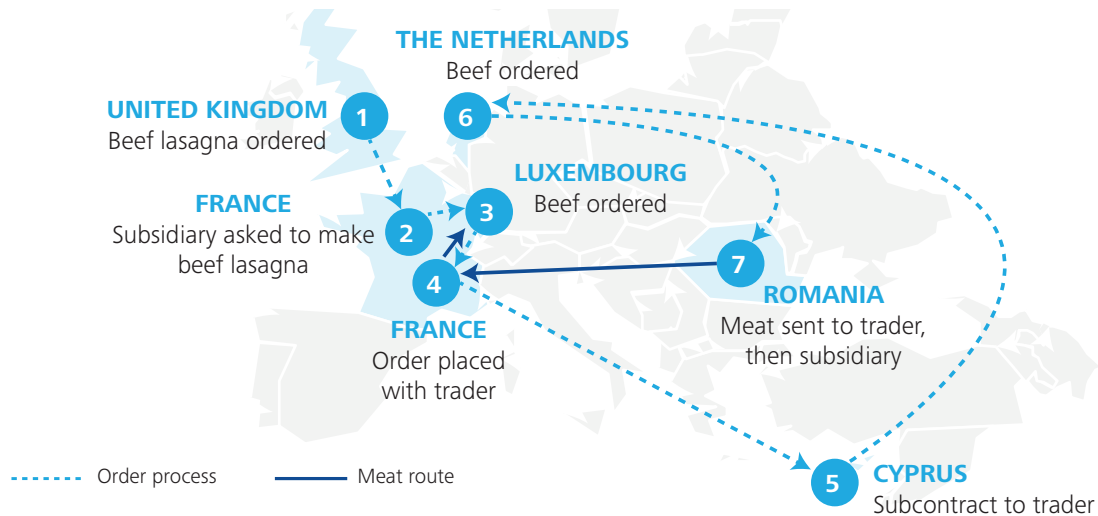
The critical role of technology

TRADITIONALLY, companies have struggled to access data about external suppliers and manage it across extended multinational value chains. However, advancements in technology now allow companies to tap into a variety of internal and external information sources for a broad-based view of supply chain participants and risks. The following examples illustrate how technology can support the transparency process.

- **Assessment tools for use across the supply chain.** Rather than conducting on-site or third-party audits, companies can now track compliance or employment data using mobile technology. LaborLink, LaborVoices, and other service providers offer confidential surveys for factory, farm, and other supplier-level employees to voice concerns via SMS technology. Compared to traditional third-party audit services, SMS-based surveys offer the advantages of real-time data, confidentiality, and reduced costs. Muddy Boots Software, for instance, recently introduced its new Greenlight Assessments app, for use on Apple iPad® mobile devices with Muddy Boots's Quickfire self-assessment system, as a portable data-collection and data-sharing tool.[14] Unilever uses the technology to track, in real time, how effectively its agricultural suppliers are complying with the company's Sustainable Agriculture Code.[15]

- **Managing *internal* key performance indicators (KPIs) with *external* supplier data.** In response to the US Foreign Corrupt Practices Act (FCPA), Dodd-Frank Act, and

UK Bribery Act, multinational businesses are required to collect information about relationships with suppliers in a global effort to thwart fraud and corruption. Many companies subscribe to due diligence services through companies like Dun & Bradstreet, MapleCroft, or LexisNexis, which provide access to databases containing information about businesses and individuals. New tools from companies like Aravo, Hiperos, and SourceMap go a step further by integrating those external information sources with internal KPIs or risk indicators. Some tools even integrate social, environmental, and other compliance metrics, helping companies visualize, anticipate, and preempt supplier-level risks.

- **Tracing individual products.** Some industries are beginning to track products from the manufacturer to the end consumer to help confirm quality and prevent fraud. For example, in anticipation of proposed federal and state "track-and-trace" legislation,[16] some pharmaceuticals companies are employing new approaches pioneered by technology start-ups, such as printing each pill with a code that can be texted to a central telephone number to verify the product's integrity. Other companies have developed technologies for embedding near-infrared spectral fingerprints or tags containing inactive ingredients into pills.[17] These technologies are helping pharmaceutical companies respond to product safety regulations, limit costly counterfeits, and provide customers with a greater sense of security.[18]

Figure 6. The interconnected supply chain revealed via the 2013 horsemeat scandal

Source: Adapted from The Guardian.com, February 15, 2013, http://www.theguardian.com/uk/graphic/2013/feb/15/horsemeat-scandal-food-safety1?guni=Article:in%20body%20link#, accessed April 8, 2014.

Graphic: Deloitte University Press | DUPress.com

- **Tracking materials from point of origin to the manufacturer.** Investigations into Britain's 2013 horsemeat scandal revealed traces of horsemeat in hundreds of meat products sold through several brands across Europe.[19] The intricacies and challenges of tracing products back to their sources through the network of suppliers quickly became apparent—a single package of meat could very easily be linked to multiple suppliers (see figure 6). If retailers and their suppliers had been able to track the individual products or even product lots back to their sources, it might have been possible to mitigate the health risk to consumers and the financial and reputational damages companies suffered. Technologies like radio frequency identification (RFID), barcoding, and tagging like that being used in the pharmaceutical industry might be a critical addition to the food industry.

- **Transparency to inform and engage end users.** Some companies voluntarily and publicly offer consumers visibility into their supply chains. Patagonia's Footprint Chronicles® web page provides a global map of the textile mills and factories that make its products, with details about each available on drilldown pages.[20] The company also uses social media extensively to educate and inform consumers about its approach to corporate responsibility, of which supply chain transparency is a prominent element. Another clothing maker, IceBreaker, provides a "baacode" with each product, which allows customers to use the company's website to trace the merino wool in the garment all the way back to the source—the sheep farm where the wool was produced.[21]

Technologies like the aforementioned are evolving at a rapid clip, and new technologies will continue to emerge in coming years. As a result, companies may struggle to decide which options to invest in and how to integrate those technologies into their existing operations and IT infrastructures. It may be effective to first understand what opportunities may be available to leverage existing technology that is already being used within the enterprise. Subsidiaries or business units often quietly test solutions "under the radar," so viable options may already exist. By assessing what is currently in use or being planned, a company can avoid reinventing the wheel and potentially deploy a solution faster by leveraging current resources.

A clear path to transparency

" [I]t was a sound, a sound made up of ten thousand little sounds. You scarcely noticed it at first—it sunk into your consciousness, a vague disturbance, a trouble. **"** [22]

— Upton Sinclair, *The Jungle*

JUST as Sinclair's *The Jungle* did in the United States more than 100 years ago, many people and organizations around the world today have the power to expose illegal, unsafe, or irresponsible practices—or simply inefficient processes—through a host of publicity mechanisms. The "sound" of their commentary could easily become more than a vague disturbance to a multinational brand—it could create lasting, serious trouble. So beyond any required regulatory compliance, businesses today have a vested interest in evaluating how transparent their supply chains are and having a clear understanding of the risks associated with their supply chains.

However, rather than viewing transparency as a challenge or burden, companies can leverage the opportunity to identify potential operational improvements, promote good corporate citizenship, reinforce the strength of their brands, and potentially minimize the impact of future events. The four steps outlined above, along with the creative use of technology, can provide companies with a clear path to transparency.

Endnotes

1. The original Food and Drug Act, passed on June 30, 1906, prohibits interstate commerce in misbranded and adulterated foods, drinks, and drugs. See Michelle Meadows, "Promoting safe and effective drugs for 100 years, food," *FDA Consumer*, January 2006, http://www.fda.gov/AboutFDA/WhatWeDo/History/CentennialofFDA/CentennialEditionofFDAConsumer/ucm093787.htm.

2. The Meat Inspection Act arose due to disclosures of unsanitary conditions in meat-packing plants, the use of poisonous preservatives and dyes in foods, and cure-all claims for worthless and dangerous patent medicines. See Michelle Meadows, "A century of ensuring safe foods and cosmetics," *FDA Consumer*, January 2006, http://www.fda.gov/AboutFDA/WhatWeDo/History/FOrgsHistory/CFSAN/ucm083863.htm.

3. The Accord on Fire and Building Safety in Bangladesh is a legally binding independent agreement designed to make all garment factories in Bangladesh safe workplaces. See "Accord on fire and building safety in Bangladesh," http://www.bangladeshaccord.org/. California's SB 657 requires companies doing business in California to disclose efforts to combat slavery and human trafficking in its supply chains. See "Senate bill no. 657, chapter 556," http://www.state.gov/documents/organization/164934.pdf. California's Rigid Plastic Packaging (RPPC) regulation requires product manufacturers that sell products in RPPC containers to meet one of several compliance options designed to improve recycling or reuse. See "California's Rigid Plastic Packaging Container (RPPC) program," CalRecycle, http://www.calrecycle.ca.gov/Plastics/RPPC/.

4. Emily Dugan, "Forced labour and human trafficking: Media coverage in 2012," Joseph Rowntree Foundation, June 2013, http://www.jrf.org.uk/sites/files/jrf/forced-labour-media-coverage-full.pdf.

5. Kelly Marchese and Jerry O'Dwyer, "From risk to resilience: Using analytics and visualization to reduce supply chain vulnerability," *Deloitte Review*, January 17, 2014.

6. Risks were narrowed using a set of over 200 supply chain risks and a Failure Modes and Effects Analysis.

7. The Failure Modes and Effects Analysis is a construct from the Lean Six Sigma toolset.

8. Marchese and O'Dwyer, "From risk to resilience;" Kelly Marchese and Scott Sopher, *The ripple effect: How manufacturing and retail executives view the growing challenge of supply chain risk*, Deloitte, 2013, http://www.deloitte.com/view/en_US/us/Services/consulting/Strategy-Operations/09e4439a0e17c310VgnVCM1000003256f70aRCRD.htm.

9. In certain instances—for example, in non-traditional supply chains and in companies that are just beginning the journey to a resilient supply chain—mapping may be performed on broader areas of the supply chain instead of individual products. An example of this is illustrated in the "Non-traditional supply chain" sidebar.

10. Deloitte client engagement experience.

11. World Wildlife Foundation, "Deforestation," http://wwf.panda.org/about_our_earth/about_forests/deforestation/, accessed February 21, 2014.

12. Deloitte client engagement experience.

13. Deloitte client engagement experience.

14. iPad® is a trademark of Apple Inc., registered in the United States and other countries.

15. Aarthi Rayapura, "Unilever using new app to assess supplier's sustainability progress," *Sustainable Brands*, March 14, 2014, http://www.sustainablebrands.com/news_and_views/ict_big_data/aarthi_rayapura/unilever_using_new_app_assess_suppliers_sustainability_pro, accessed April 9, 2014.

16. In 2013, the US Congress proposed both the Pharmaceutical Quality, Security and Accountability Act (S.959) and the Safeguarding America's Pharmaceuticals Act (H.R. 1919), but was unable to pass either. California's e-pedigree law is scheduled to take effect in January 2015. See "Surprise! No federal law on track-and-trace or e-pedigree made it out of Congress before the summer recess," *Pharmaceutical Commerce*, August 3, 2013, http://pharmaceuticalcommerce.com/latest_news?articleid=26934, accessed April 8, 2014.

17. Stephanie Baum, "4 anticounterfeit drug startups you should know about," *Medcity News*, October 23, 2012, http://medcitynews.com/2012/10/4-anti counterfeit-drug-startups-you-should-know-about/#ixzz2l1txqxJi, accessed April 8, 2014.

18. Ibid.

19. Henry Chu, "Britain opens criminal probe of horse meat contamination scandal," *Los Angeles Times*, February 8, 2013, http://articles.latimes.com/2013/feb/08/world/la-fg-wn-britain-food-scandal-20130208, accessed April 8, 2014.

20. Patagonia, "The footprint chronicles," http://www.patagonia.com/us/footprint/, accessed April 9, 2014.

21. IceBreaker, "Trace your garment," http://us.icebreaker.com/en/why-icebreaker-merino/trace-your-garment-with-icebreaker-baacode.html, accessed April 9, 2014.

22. Upton Sinclair, *The Jungle*, (New York: Doubleday, Page & Company, 1906), chapter 2.

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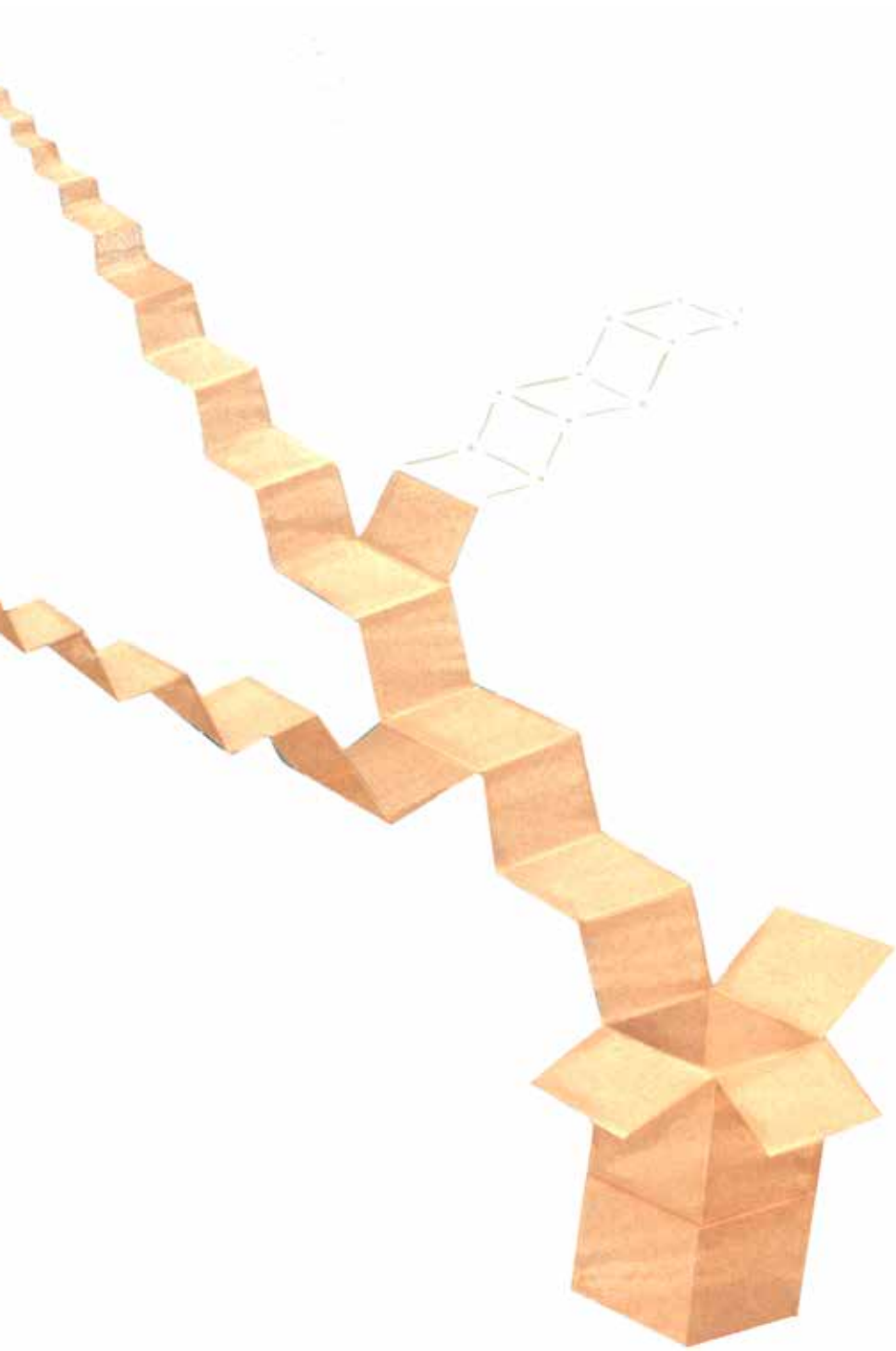Deloitte Consulting LLP
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