Supply Chain Risk Solutions: A Market Overview

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As critical as supply chain risk management has become, the market for solutions in this area is still emerging and evolving. Solutions are incredibly diverse and wide-ranging. Here we establish a framework for the market and examine the segments, functionality, and players.

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Introduction

At ChainLink we have been researching and writing about supply chain risk for over a decade. Lately, it seems there has been a crescendo of attention paid to this area. In spite of that, there is a dearth of cogent market definitions and good descriptions of the types of solutions available. Part of the reason for this void is the very broad range and variety of supply chain risks (see Figure 1), which makes it difficult for solution providers to create a comprehensive service or solution and makes it challenging for analysts to describe and frame the whole solutions landscape.

![Figure 1 – Example Supply Chain Risks](source: ChainLink Research)

After working on many risk management projects across many industries, as well as ongoing research for our clients, we have gained direct working knowledge of these various risks and their corresponding solutions. From this we have developed a framework for the Supply Chain Risk Management solutions

1 See ChainLink’s [Supply Chain Risk Research Library](#).
market (see Figure 2 below). We divide the supply chain risk solutions market into Core, Supporting, and Ancillary solutions:

- **Core**: Platforms focused exclusively or primarily on supply chain and supplier risks.
- **Supporting**: Applications focused on one specific area of supply chain risk, such as cargo theft, product quality, IP theft, anti-counterfeiting, and so forth. These generally support or integrate with one of the core platform segments (as indicated by dotted lines in the diagram below).
- **Ancillary**: Enterprise solutions that primarily perform other functions (such as managing transportation or demand) but include some elements that help manage supply chain risk (such as on-time delivery or demand volatility).

Companies deploy a mix of these solutions to manage supply chain risks. In fact, the ancillary solutions serve multiple other purposes and are often not purchased primarily to manage supply chain risk.

Although some of the sub-sectors within this space are quite mature, the Supply Chain Risk solutions market as a whole is an emerging and rapidly evolving market, with many new entrants and applications. As such, we see a large and diverse set of solutions and problems being solved in different ways. There is also a fair amount of overlap between some segments, and some solutions span multiple
segments, making clean segmentation of the market challenging. Providers are continually expanding their footprints, driven by market demand for broader and deeper capabilities, innovations in how to manage risk, new regulations (e.g. conflict minerals), new or evolving risks (e.g. cyber-security, IP theft), and other factors.

Supply chain risks continue to grow in importance and diversity. Across a wide variety of industries, regulatory compliance requirements continue to expand and deadlines are coming due, such as the Food Safety Modernization Act, the Consumer Safety Protection Act, Dodd Frank section 1502 for Conflict Minerals, REACH, and many more. Recent times have also seen increasing incidents including shocking labor and working condition practices (e.g. the Bangladesh disaster), increasing frequency of extreme weather events, tainted food, and elevated consumer awareness of the nature and extent of outsourcing with the subsequent demand to know what and where the products really come from. Suppliers are entrusted with increasing responsibilities, from managing facilities and data centers, to safely manufacturing products, as well as securing information. The financial impacts of risky supply chains are now beginning to be understood as well. For these reasons, people are starting to seriously invest and our research indicates the supply chain risk market is coalescing and growing. In the following pages, we delve into the various segments of this dynamic market.

Core Solutions

Establishing a precise dividing line between Core vs. Supporting segments in this market is somewhat arbitrary. Having said that, we generally find that the following four segments form the core platforms and services for managing supply chain risk:

- **Supplier Risk and Compliance Management**—These systems pull together and centralize information from a variety of enterprise systems and third party/public sources, to maintain an up-to-date, company-wide single-version-of-the-truth about suppliers. They can combine disparate information, such as on-time delivery or quality measures from an ERP or quality management system, with news from external feeds, supplier survey results, and trigger events, to measure, analyze, track, and predict supplier and supply risks of all sorts, and ensure ongoing compliance.

- **Supply Chain Mapping and Monitoring**—The ability to map multiple tiers of the supply chain is critical, to understand what components are manufactured where, and monitoring events on the ground in order to understand the impact of those events on a company and its supply chain.

- **Traceability, Chain-of-Custody**—Being able to track products and materials flowing through the supply chain on a very granular level is key to managing many types of risks.

- **Supply Chain Risk and Business Continuity Consultants**—Consulting services can fill in the gaps in expertise, resources, and functionality that are so common in early stage markets.

Supply Chain Mapping and Monitoring and Traceability/Chain-of-Custody tracking in particular encompass very granular (e.g. item-level, plant-level) and often real-time information about individual products, specific facilities/sites, specific people, and the actual physical processes as products flow...
through the chain. Traditional enterprise systems may have some data about products and suppliers,\(^2\) but they do not provide the level of detail or real-time tracking tied to actual events on the ground.

The core elements are defined in more detail below.

**Supplier Risk and Compliance**

- **Context/Purpose:** With the advent of massive amounts of outsourcing, lean strategies, and deeper strategic supplier relationships, companies are increasingly reliant on and exposed to risks by suppliers. These risks are incredibly diverse: supplier financial viability, non-performance, fraud, quality and safety, IP exposure, litigation, and non-compliance with regulations such as FCPA, REACH, RoHS, and Conflict Minerals, to name a few. Some solution providers offer ongoing services to help manage supplier risks, acting as an extension of the customer’s team.\(^3\)

- **Typical Functionality:** Supplier information repository, supplier risk metrics, risk dashboard and analytics, supplier surveys and self-service data collection mechanisms, rules-based supplier on-boarding data collection and risk mitigation workflows, risk alerting and prediction, corrective action planning and progress monitoring, diligence and data collection services.

- **Typical Users:** Sourcing Professionals

- **Example Solution Providers:** Aravo, CVM/Kroll, Hiperos, SupplierSoft, HICX, Dow Jones, Ivalua

**Supply Chain Mapping, Modeling, and Monitoring**

- **Context/Purpose:** The 2011 Japanese tsunami and Thailand floods were a wakeup call for many companies who struggled to understand their own multi-tier supply chain, the impact on production and revenue, and the actions needed to mitigate the effects. This was primarily due to lack of up-to-date information on what were the most critical components, exactly where they were made, status of those plants, up-to-date contact information, and so forth. As a result, some companies have started to attempt to map out their multi-tier supply chain. This can be a very labor-intensive undertaking, and to be useful the information must be kept up-to-date.

\(^2\) Just knowing a supplier’s headquarters and main phone number doesn’t help much when it comes to managing risks and disruptions.

\(^3\) For more on this approach see [Co-Managing Supplier Risk](#).
Hence, companies will focus first on mapping the most critical components for their most critical products.

- **Typical Functionality:** Some mapping solution companies, such as Achilles and Amerigo, provide mapping on a supplier/part level, but not necessarily down to the plant/location level. At least one solution provider, Resilinc, focuses specifically on multi-tier mapping and monitoring down to the plant/location level. This more granular mapping includes functionality such as: identify the most critical parts (based on risks to revenue, profit, brand, etc.), map multi-tier supply chains for critical parts back to individual production sites, maintain part/site-specific information (contact info, continuity plans, recovery times, alternates, etc.), monitor events in real time, correlate and analyze the impact of events, create and monitor mitigation plans/actions, model the supply chain and perform what-if analysis. Consulting companies may also do supply chain mapping projects at various levels of granularity. (Note: Some of the other segments include other kinds of supply chain mapping. For example, Sustainability/CSR can include chain-of-custody mapping to confirm that products originated from fair labor, fair trade, or conflict-free sources.)

- **Typical Users:** Supply Chain Risk, Sourcing and Procurement, Supply Chain Management
- **Example Solution Providers:** Resilinc, Achilles, Amerigo

### Traceability, Chain-of-Custody

- **Context/Purpose:** There are many reasons to track the provenance/source and chain-of-custody of products from inbound/upstream components and materials to outbound/downstream finished goods all the way to the end customer. These may include sustainability goals (sourcing from fair trade, conflict-free, sustainable forestry sources), certified organic, ensuring safety and quality, complying with regulations such as pharmaceutical, food, and aerospace traceability requirements, and anti-counterfeiting, to name a few. Some solutions provide ‘one-up, one-back’ traceability—the ability for a manufacturer to definitively trace outbound finished goods back to inbound lots and batches (or serialized eaches) of components and materials. Other solutions provide end-to-end traceability through a network, often using a cloud-based approach to connect multiple trading partners and service providers. There is some overlap with other supporting sectors listed, such as sustainability, anti-counterfeiting, and cold chain.

- **Typical Functionality:** One-up/one-back traceability, product genealogy and packaging hierarchies, locate and quarantine potentially defective products, track and trace, serialization, field monitoring, ePedigree

- **Typical Users:** Production Manager, Quality, Compliance
Supply Chain Risk and Business Continuity Consultants

- **Context/Purpose**: Managing supply chain risk can require expertise and resources beyond what many companies have. There are a number of consulting firms that provide a very wide variety of supply chain risk-related services.
- **Typical Functionality**: Risk assessments, strategy, policy development, solution selection and deployment, supply chain mapping, supplier audits, supplier due diligence, business continuity management
- **Typical Users**: Sourcing, Supply Chain, Finance, Compliance
- **Example Solution Providers**: Deloitte, JLT, Accenture, PwC, EY, Bain, ABS

Supporting Solutions

In contrast to the core segments, which each address a broad range of supply chain risks, there are a number of ‘supporting solutions’ that each target a specific type of supply chain-related risk, such as counterfeits, cargo theft, quality issues, supplier non-performance, IP theft, and so forth. These represent specific problems that require very specific solution sets. In some cases, the variety of solutions within a single segment is extremely diverse. For example, within the anti-counterfeiting solutions segment, a multi-layered defense is recommended, which may include a variety of overt and covert authentication elements on the package (3D holograms, nano-patterning, packaging substrates, invisible inks, etc.), serialization combined with chain-of-custody tracking, investigation and enforcement services, retailer outreach, and anti-counterfeiting programs/services.

Supplier Audit and Monitoring Services

- **Context/Purpose**: Supplier Risk and Compliance solutions (described above, page 4) rely heavily on self-reporting from suppliers. Some risks are critical enough that these self-assessments need to be verified by on-site audits and/or ongoing on-site monitoring at suppliers’ facilities. However these audits can be expensive and resource-consuming for the buyer and cause ‘audit fatigue’ for the supplier (who may have dozens of customers coming in to do audits). As a result, third parties have emerged that provide these services on behalf of a community of buyers. Some provide specific certifications, such as ISO 9001, AS9100, SA8000, ISO 22000, PAS 220, and numerous others, and may maintain a shared repository of these supplier certifications. Some solutions serve a specific industry or sector, such as apparel or food or aerospace. Many focus on CSR or quality audits.
- **Typical Functionality**: Standard and custom onsite supplier audits, factory monitoring, quality testing and monitoring, certifications
Supplier Quality Management

- **Typical Users**: Sourcing, CSR, Compliance, Quality
- **Example Solution Providers**: Elevate, TÜV, SQA, SGS, Bureau Veritas, Intertek, QIC, AMREP, NSF, NQA

Supplier Quality Management

- **Context/Purpose**: It is not just natural disasters that can disrupt a supply chain. Lapses in the quality of inbound parts or materials can shut down a production line, sometimes for weeks or even months when quick fixes or alternatives are not readily available. Supplier quality is especially important in engineered products containing customized components or materials, which may take months to find, qualify, and switch to a new supplier. Keeping a tight rein on quality by closely monitoring supplier quality and having robust, rapid corrective action processes is a key part of managing supply chain risk.
- **Typical Functionality**: Qualify, select, and monitor suppliers, quality scorecards, Approved Vendor List (AVL) management, remediation/corrective action and preventive action (CAPA), supplier quality audits, inspection services
- **Typical Users**: Quality Manager
- **Example Solution Providers**: Sparta, SQA, AssurX, InfinityQS, CyberMetrics, QIT, GSQA

Supplier Performance Management

- **Context/Purpose**: Problems with supplier performance—such as late deliveries, non-compliance with various customer requirements (routing guides, labeling, packaging, documentation, electronic communications, etc.), and quality issues—are one of the early indicators that a supplier is in trouble. The earlier and more systematically a company spots and addresses these warning signs, the more degrees of freedom and effectiveness of corrective action they have.
- **Typical Functionality**: Supplier performance scorecards and dashboard integrating information from many sources, corrective action workflows and program management
- **Typical Users**: Sourcing and Procurement
- **Example Solution Providers**: Aravo, Ariba, MetricStream, Iasta, Bravo, Hiperos

Contract, SLA Management

- **Context/Purpose**: When a buyer and supplier go through the effort to formalize an agreement in writing, it makes it more likely that they will have a common understanding of what is expected of the supplier. However, without a systematic way to create, access, and monitor conformance with contracts, non-compliance is much more likely. One aspect of contract management—Contract compliance and SLA (Service Level Agreement) monitoring—has much in common with Supplier Performance Management and hence there is some overlap in suppliers and solutions between the two categories.
Typical Functionality: Contract authoring, negotiations, approval workflows, e-signature, repository, search, compliance and commitment monitoring, review and audit services

Typical Users: Sourcing and Procurement, Legal


Supplier Data Subscription Services

Context/Purpose: Supplier Risk and Compliance solutions often rely on third party data services to obtain information about suppliers, including financial/credit, diversity/ownership, corporate structure, locations, legal/litigation actions, product data, news/media coverage, executive backgrounds, M&A, denied trade screening, and more. Sometimes these services are bundled into the Supplier Risk solution; other times they are sold separately.

Typical Functionality: Supplier information data feeds, interactive queries, news monitoring

Typical Users: Sourcing, Finance, Compliance

Example Solution Providers: Dunn & Bradstreet, LexisNexis, Equifax, CVM/Kroll, ISI, Accuity, Dow Jones / Factiva, Semantic Visions

Hedging Tools and Instruments

Context/Purpose: The risks presented by highly volatile commodity prices, as well as exchange rate risks, can be managed by various hedging strategies, such as customer surcharges (transferring the risk to the customer), supplier price guarantees (transferring the risk to supplier), and hedging instruments (transferring the risk to a third party). For more, see “Managing Supply Risk: Hedging Strategies.”

Typical Functionality: Analytics, Market Data and Research, Regulatory Compliance, Consulting, OTC Instruments

Typical Users: Commodity Manager, Trader, Treasury, Risk Manager

Example Solution Providers: CSS, SunGard, Hedge Solutions, Reval, SunTrust, SAP, DSC, CME, LME

Cargo Security

Context/Purpose: Cargo theft is certainly not new, but it is a persistent problem. With far-flung global supply chains comes additional risk, particularly in developing countries which often have fewer and less effective policing resources. Worldwide losses from cargo theft are estimated at $50B-$60B. For some insights and best practices, see “How the Pharmaceutical Industry Has Dramatically Reduced Thefts.”

Typical Functionality: Seals and locks, secure pallets, traceability systems, driver and warehouse personnel screening, GPS vehicle tracking with ignition kill, video surveillance, security assessments and strategy consulting, armed escorts, community outreach and awareness, industry coalitions

Typical Users: Security, Logistics

Example Solution Providers: CSA, SCN, Unisys, GlobalTrak, TCSC, Schneider, Covenant, ISIO, FreightWatch, TSI, Reltronics, Sealock, TydenBrooks
Sustainability/CSR platforms, Product Analytics

- **Context/Purpose**: Sustainability, Corporate Social Responsibility (CSR), Fair Trade, carbon footprint, and related areas have grown immensely in importance in recent years. Issues such as labor abuses in the supply chain can be devastating to a brand. There are also legislative requirements impacting products such as WEEE, RoHS, REACH, JEDEC, and the Conflict Minerals regulations within Dodd Frank.

- **Typical Functionality**: Bill-of-Material analysis for compliance (integration with PLM and ERP systems), trade-off and what-if analysis, Life Cycle Assessment (LCA), supplier data collection (portal and email interfaces, workflows with auto-escalation for non-responsive suppliers), aggregating/repository, compliance reporting, support for third party auditors (e.g. audit trails), regulation updates, multi-tier tracking, supplier on-boarding and training

- **Typical Users**: Design Engineers, CSR/Sustainability, Compliance

- **Example Solution Providers**: PTC, Oracle/Agile, iPPoint, Source Intelligence, Resilinc, Assent, Aravo, ENOVIA/Dassault, MetricStream, HICX, GreenSoft, LockPath, Actio

Cold Chain

- **Context/Purpose**: There is an increasing need to monitor the temperature of food and temperature-sensitive pharmaceuticals as they travel across the supply chain, to mitigate spoilage risk for food and efficacy risks for pharmaceuticals. Solutions are varied, including temperature recorders, end-to-end temperature tracking and monitoring, cold-chain packaging and containers, and cold-chain transportation and logistics services.

- **Typical Functionality**: Temperature monitoring and logging, repository, packaging, refrigeration systems, refrigerated transport, consulting

- **Typical Users**: Logistics Manager, Produce Manager, Packaging Engineer

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4 For more on cold chain, see “Winning the Freshness Wars,” “Carton-level Temperature Tracking for Cold Chain Pharmaceuticals—Why Now?” and the rest of ChainLink’s Cold Chain Library.
Example Solution Providers: Intelleflex, BT9, World Courier, GCCS, CCT, UPS, Timestrip, Escort, DeltaTRAK, Carrier, AcuTemp, TOWER, Intelsius

Anti-counterfeiting Solutions
- **Context/Purpose:** Counterfeit products are a serious problem across most manufacturing industries. It is not just high end handbags and luxury goods, but consumer goods of all types, pharmaceuticals, electronic components, auto parts; the list goes on and on. Estimates of global counterfeits range from about 2% ($650B) to 7% ($2.5T) of all world trade. It is even higher in some sectors such as pharmaceuticals, where the World Health Organization estimates 10% of all medicines sold globally are counterfeit (nearly 50% in some developing countries). As mentioned in the introduction to this section, companies will usually use a multi-layered approach to solving the problem. As such, this category encompasses a particularly diverse set of solutions from hundreds of different solution providers. More information and resources, including many solution provider companies, can be found at the IACC ([International Anti-Counterfeiting Coalition](#)).
- **Typical Functionality:** Packaging (3D holograms, color-shifting inks, tear tapes, laminates, nanopatterning, packaging substrates, invisible inks and varnishes, RFID), taggants, Laser Surface Authentication, serialization, chain-of-custody/traceability/e-pedigree, field audit & inspection tools and programs, investigative and enforcement services, retailer outreach, and anti-counterfeiting programs
- **Typical Users:** Packaging Engineers, Product Engineers, Distribution/Channel Logistics, Channel Manager, Brand Manager, Legal
- **Example Solution Providers:** Authentix, Ingenia, JDSU, DuPont, SICPA, Inmar, YottaMark, INSURE, Colorcon, Baker & McKenzie, Melbourne IT, Gibney, Axway, Acsis

Event Monitoring and Alerting Services
- **Context/Purpose:** Companies want to be alerted about a wide variety of events that may impact them and their supply chain, such as weather, natural disasters, political events, labor unrest, etc. Providers in this segment may specialize in specific categories of events, such as weather or specific purposes such as travel alerts. These same platforms can be used to provide alerts impacting the supply chain. Users configure the solution to provide alerts only for events that are
relevant to them. This can take many different forms, such as asking for events that affect key plants and lanes within your supply chain. In that scenario, these tools are often combined with supply chain mapping/location/supplier data to help define which events are relevant. An emerging subset within this category is spatial complex event processing platforms, notably TransVoyant, which ingests massive amounts of real-time data and runs that against a set of rules to generate specific alerts in near real time.

- **Typical Functionality**: Alerts and information events. Analysis of the events and how they impact your company or project or supply chain.
- **Typical Users**: Wide variety across the enterprise
- **Example Solution Providers**: IJET, NC4, TransVoyant, Planalytics

**Supply Chain Insurance**

**Context/Purpose**: Risk transfer is an important option for several types of supply chain risk. This allows companies to mitigate some of the financial impact of supply chain disruptions. Insurance companies have gradually expanded into Contingent Business Interruption (CBI) insurance to insure against disruptions to production at specific supplier facilities. Recently Zurich started offering supply chain interruption (SCI) which is broader than CBI. However, SCI offerings are new and coverage limits are relatively modest as insurance companies and buyers learn how to make it all work. There are a variety of other insurance offerings to cover various other supply chain-related risks, such as Cargo Insurance, PP&E (Property, Plant, and Equipment), Product Liability, FCPA, and Intellectual Property insurance, to name a few. Often a company will have a full portfolio of these products, even though there may be some overlaps.

- **Typical Functionality**: Risk Assessment, Contingent Business Interruption Coverage, Supply Chain Interruption Coverage
- **Typical Users**: Risk Manager
- **Example Solution Providers**: Zurich, Marsh

**Business Continuity Management**

- **Context/Purpose**: Business continuity efforts typically focus within the company and how well it is prepared for disaster or disruptions, with up-to-date, well-practiced contingency plans. However, it has become increasingly important to think of critical suppliers as an extension of the company and ensure that suppliers are just as prepared, and that the customer has contractual priority if the supplier’s production capacity becomes overwhelmed. For more see “Supplier Business Continuity” and DRJ’s Resource Guide.

- **Typical Functionality**: Risk Analysis and BIA (Business Impact Analysis), Continuity Planning and Strategy, Continuity Exercise Testing/Validation, Plan audits, Plan update and maintenance, Emergency Notification, Incident Management, IT Disaster Recovery/Failover, Program Management
- **Typical Users**: Business Continuity Manager, Manufacturing, Sourcing

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5 For more see “Supply Chain Insurance—Can It Be an Attractive Insurance Product?”
Example Solution Providers: Virtual Corp, Paradigm, RSA Archer/EMC, Neverfail, COOP, PlanB, ABS, Continuity Central, Continuum, FDI, eBRP, SunGard, RecoveryPlanner, ClearView

Design Collaboration / IP Protection

- **Context/Purpose:** Modern engineered products, such as vehicles and high tech equipment, as well as pharmaceuticals, cosmetics, and foods, often involve collaboration between an OEM and multiple design partners, exposing sensitive IP (Intellectual Property). Furthermore, design details are often shared with outsourced manufacturers. Many firms have found out the hard way about the risk and damage caused by inadequate protection for their IP.
- **Typical Functionality:** Secure PLM, Secure Collaboration, Digital Rights Management, Document Security, Data Loss Prevention, Data Integrity Protection
- **Typical Users:** Design Engineers, Sourcing, Legal
- **Example Solution Providers:** PTC, ENOVIA/Dassault, NextLabs, CADLock, CADavista, SafeNet, Thomson Reuters, TITUS, Surety, Brainloop, Verdasys, BEW, Symantec

Trading Partner IT Security / Identity Management

- **Context/Purpose:** As companies become increasingly integrated electronically, they become exposed to security breaches via weaknesses in their trading partners’ systems and security practices. Protecting against this requires a variety of solutions including strong security for the company’s own systems as well as publishing, verifying, and enforcing minimum requirements for trading partners’ security policies and systems.
- **Typical Functionality:** Multi-factor Authentication, Identity Management and Access Control, Secure Communications/Managed File Transfer, PKI/Digital Signatures, Data Loss Prevention, Intrusion Detection
- **Typical Users:** IT Security
- **Example Solution Providers:** RSA/EMC, Entrust, Exostar, CA, SafeNet, CLEO, Adeptia, Informatica, OpenIAM, ARX, GlobalSign, DigiCert, Trustwave

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6 See “Data Loss Prevention? There’s A Service For That”
Ancillary Solutions

Companies implement solutions to broader sets of problems (such as demand management or logistics) that are not really thought of as supply chain risk solutions. Nevertheless, these solutions include some important aspects of managing supply chain risk. We are referring to these as ‘Ancillary Solutions’ within our framework.

Governance, Risk Management, and Compliance

- **Context/Purpose**: The advent of Sarbanes-Oxley (SOX) and the subsequent responsibilities and consequences it placed on senior executives, as well as the spate of other regulations (e.g. FCPA), spawned a greater interest in GRC (Governance, Risk Management, and Compliance). GRC is not a technology, but rather a set of management disciplines that is often supported by GRC solutions.
- **Typical Functionality**: Finance and Audit GRC, IT GRC, Legal GRC, Enterprise Risk Management including Operational Risks, such as supply chain
- **Typical Users**: Senior Executives, Risk Managers, Compliance, Legal, IT, Finance
- **Example Solution Providers**: MetricStream, Epicor, SAP, Thomson Reuters, Modulo, Agiliance, ActiveRisk, RSA Archer/EMC, Oracle, SAI, IBM, SAS

Inventory Optimization, Demand Management

- **Context/Purpose**: Excellence in demand management and inventory planning is vital to maintaining high performance and profitability in the face of uncertain conditions. Within this context, companies strive to improve forecast accuracy, based on a variety of market and supply conditions, as well as plan inventory to ensure optimal inventory positioning (right products in the right places). These are key contributors to reducing supply chain risk, especially in the face of volatile demand and/or uncertain supply.
- **Typical Functionality**: Forecasting, Demand Signal Repository, Inventory Optimization, Promotion management, VMI, Replenishment management
- **Typical Users**: Supply Chain Planners
- **Example Solution Providers**: Logility, Steelwedge, ONE Network, Terra Technology, JDA, Kinaxis, E2Open, Adexa, SmartOps/SAP, ToolsGroup

Logistics, Visibility, TMS

- **Context/Purpose**: Managing the physical flow of goods through a global supply chain is highly complex with many opportunities for things to go wrong. The same systems that are used to optimize the most efficient physical product flows can also be used to help reduce risks.
- **Typical Functionality**: TMS, WMS, GTM
- **Typical Users**: Transportation, Distribution, Warehouse Managers
- **Example Solution Providers**: Descartes, GT Nexus, MercuryGate, Manhattan, JDA, Savi, Amber Road, IBM Sterling

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7 For more on the broader context of Demand Management, see “Demanding Times” and ChainLink’s Demand Management library.
8 The next issue (July 23rd) of the brief will include a report on Multi-Echelon Inventory Optimization.
9 See “Transportation Management Technology”.
Conclusion

Supply chain risk cannot be pigeonholed into one function or one type of software solution. It requires a multi-faceted approach, with many of the facets integrated into the broader array of enterprise functions such as sourcing and procurement, logistics management, design engineering, supply chain planning, quality management, compliance management, IT, and legal and risk management departments; not to mention the myriad of third parties (logistic providers, inspectors and auditors, brokers, consultants, etc.) and of course the multiple tiers of suppliers. As we have seen, the solutions span many categories as well, with increasing emphasis on real-time capabilities, sensors and RFID, SaaS/cloud, cyber security, and physical security capabilities.

We do see forward-looking organizations building centralized supply chain risk groups with the daunting responsibility to integrate supply chain risk management efforts across the various functional departments and external players. We expect as this market sector matures, there will be increasingly integrated and broad sets of solutions as well. One thing is for sure; the importance of supply chain risk management will continue to grow for a very long time to come.
Appendix A: References and Resources

Since the early days of ChainLink Research we have been researching and writing about Supply Chain Risk. Our thinking has evolved as the implications of global supply chains and the risks inherent in global chains have been more broadly understood.

Here are links to some of the reports and writings we have done:

Collections:
- Supply Chain Risk Management
- Traceability / Track and Trace
- Sustainability

Reports:
- Urgency for Supply Chain Resilience: Results from ChainLink's 2011 Supply Chain Risk Survey
- Reducing Risk in Global Life Sciences Chains
- Supply Chain Risk and its Impact on Equity Volatility

Webinars:
- Managing Supply Chain Risk
- Managing Risk: Lessons Learned from Global Manufacturers