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# *Enhanced Supply Chain Risk Management*

**September 23, 2013**

## ***Supply chains are evolving***

As a result of an increasingly global economy, supply chains have become more global and complex



- Increasing interactions of global supply chain networks **complicate** the assessment and quantification of supply chain risk
- Growing complexity in a supply chain adds to risk management **uncertainty**
- The further removed a risk is to a given firm, the **less transparent** its exposure is

Unlike the generally siloed supply chain structure of past generations, the current global economic environment includes offshore production, sourcing materials from different locations, and numerous partnerships between nations and suppliers

## ***As supply chains evolve and become more complex, the risks the supply chain is exposed to is increasing***

<b>Risk Category</b>	<b>Example Risk Events</b>
Enterprise risk at supply chain partner	<ul style="list-style-type: none"><li>• Supplier financial crisis, cash shortage, credit rating loss</li><li>• Supplier regulation non-compliance</li><li>• Supplier IT systems disruption</li></ul>
Environmental risks	<ul style="list-style-type: none"><li>• Natural disasters (earthquake, tsunami, etc.)</li><li>• Pandemic</li><li>• Terrorism</li><li>• Industrial accidents</li></ul>
Supply-demand mismatch risks	<ul style="list-style-type: none"><li>• Raw material price fluctuation</li><li>• Currency fluctuation</li><li>• Under/over capacity</li><li>• Scarcity</li></ul>
Process risks	<ul style="list-style-type: none"><li>• Equipment breakdown</li><li>• Product development delays</li><li>• Product quality impact</li></ul>
Inter-node and Logistics risks	<ul style="list-style-type: none"><li>• Air/sea port disruption</li><li>• Freight capacity shortages</li><li>• Inter-partner communications break down</li></ul>

**The evolution of the modern supply chain makes it difficult to understand and manage. This can lead to “blind spots” resulting in potential supply chain disruptions that can have substantial financial implications**

## ***The associated increase in supply chain risks directly impacts business success***

- **The size of business interruptions caused by supply chain risks is significant. For example**
  - Total economic losses of the **2011 Thai Floods** are estimated at ~\$30 billion of which only \$12 billion was insured
  - Total economic losses of the **2011 Japan Earthquake/Flood** are estimated at approximately \$210 billion of which only approximately 20% was insured
  - A supplier delay caused Fiat to shut down manufacturing facilities and delay the production of 5,500 cars valued at approximately \$100 million\*
- **As supply chain exposures are global this trend is expected to continue**
  - The World Economic Forum categorizes risks into 5 categories: economic, environmental, geopolitical, societal, and technological
  - Within these categories, the most significant supply chain risks include global governance failure, terrorism, extreme weather, major systemic financial failure, volatility of energy and agriculture prices, and resource supply vulnerability
- **Recent studies indicate a firm's share values decrease an average of 7% after a reported disruption**

**\$3.2  
Billion**

The average estimated loss in market cap of a Fortune 500 company in the event of a reported disruption

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## ***Few of today's supply chains are sufficiently managed to withstand growing supply chain risks***

The increasing complexities in supply chains result in added system vulnerabilities and constraints

**8%**

Percent of responding companies who could confirm that all of their key suppliers have business continuity programs in place to deal with disruption

Percent of responding companies who reported a supply chain incident and disruption in 2011

**85%**

**44%**

Percent of US-based responding companies who considered supply chain disruption in business continuity and risk management programs

Percent of responding companies that reported a supply chain incident disruption, and the disruption occurred below the first tier supplier

**40%**

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## ***Current solutions for supply chain risk management fail to accurately account for potential risks***

Companies have historically focused on one or two dimensions, at varying levels of depth and granularity.

Supply chains are effectively networks of production inputs, dependencies and outputs

Taking a more limited perspective results in missed opportunities and increase the risk of negative events

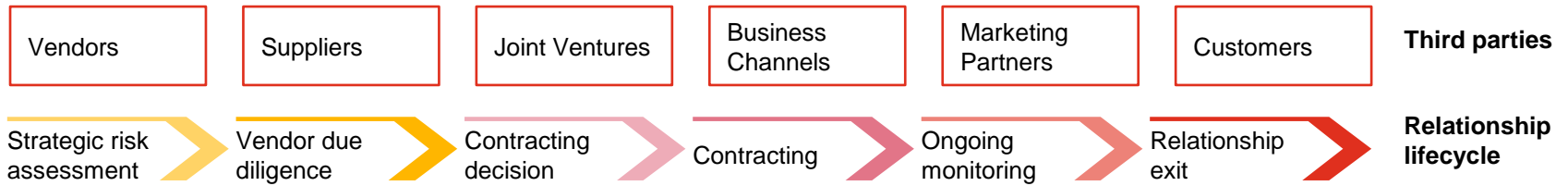
### **Effective management of supply chain risk and resilience should focus on 3 dimensions:**

1. Vendors (multi-tier)
2. Product (source to finished)
3. Network (node and route)

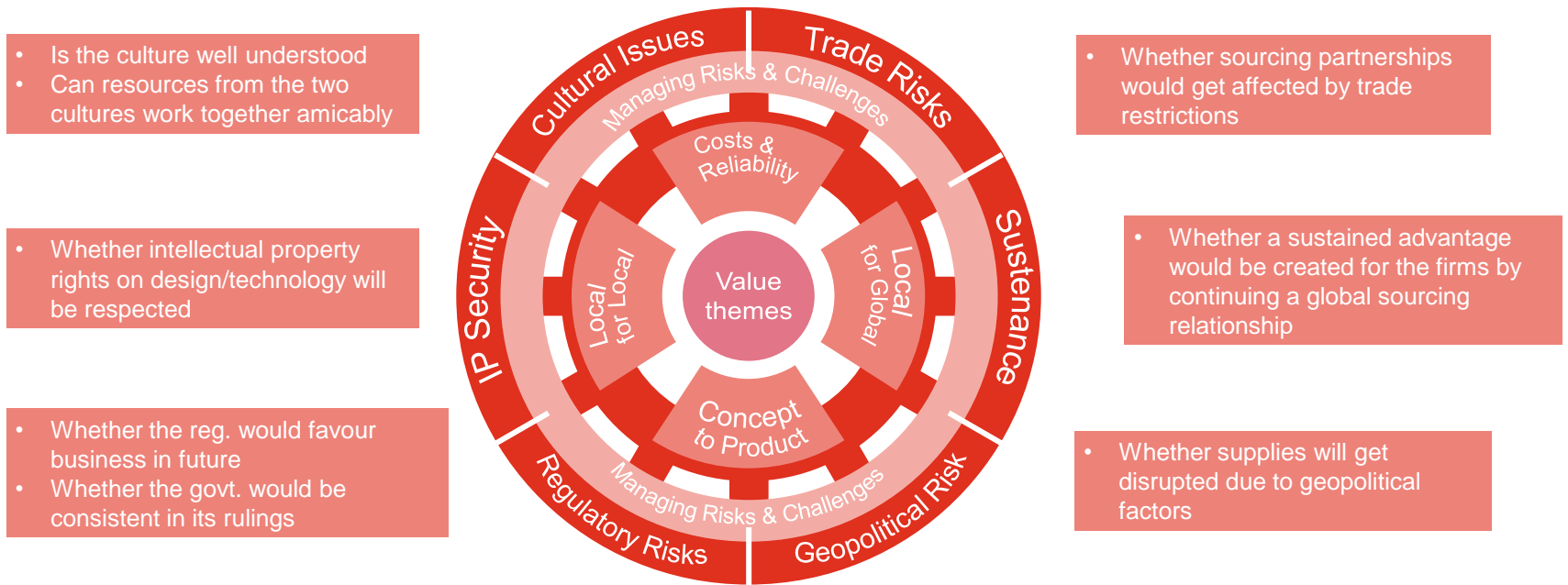


# Vendor risk

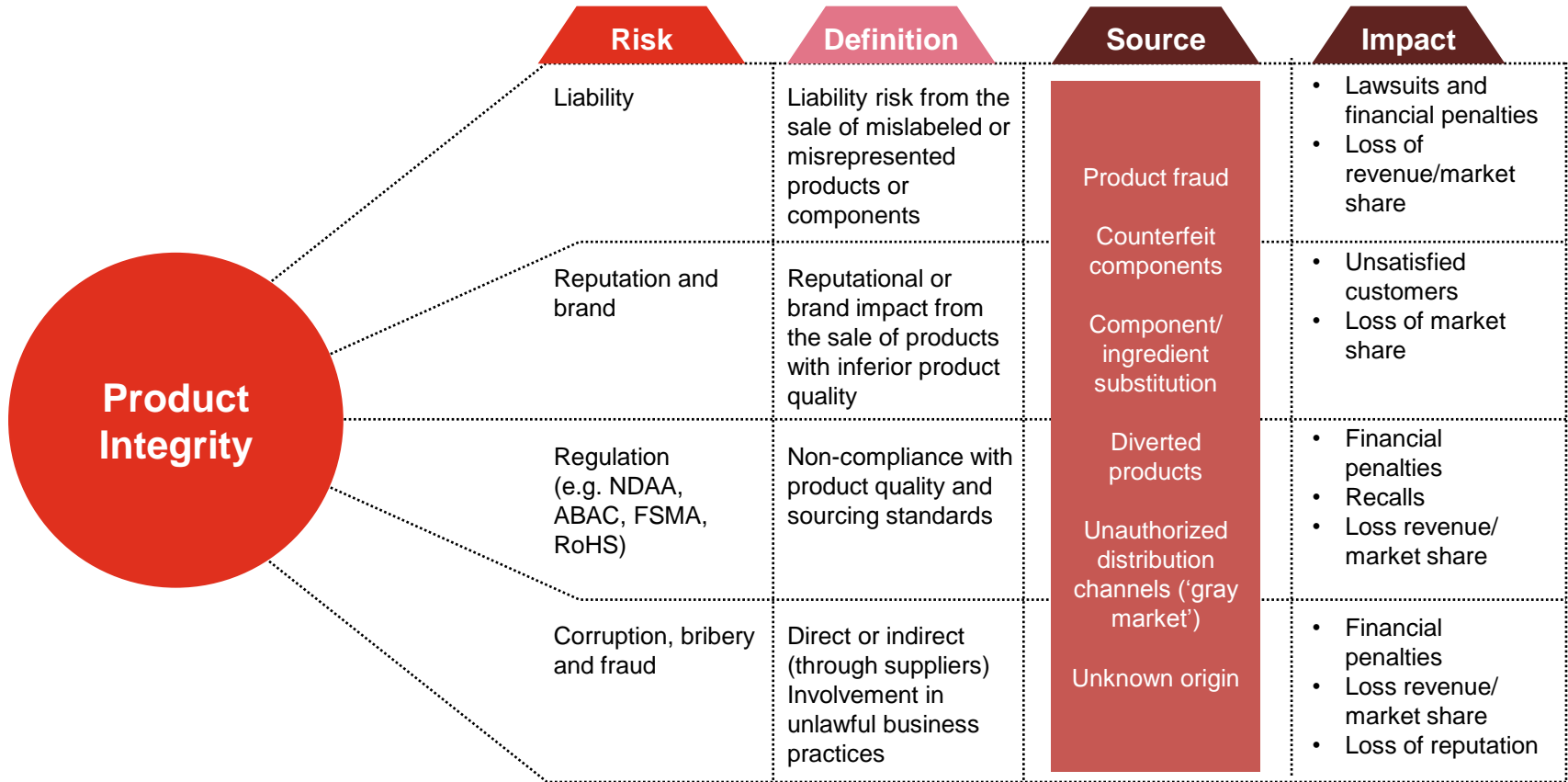
Vendor risk management (VRM) is focused on understanding and managing risks associated with vendors and third parties with which the company does business.



Sourcing Framework



# Product risk

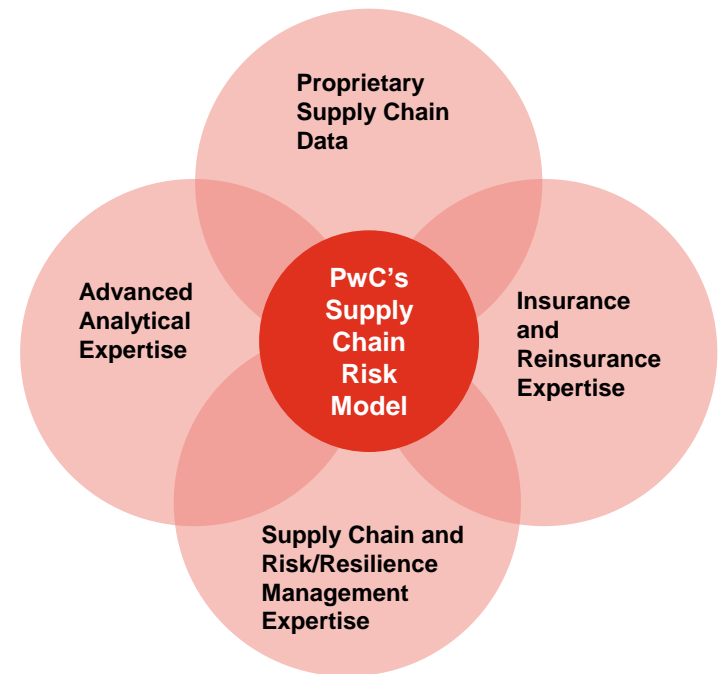




## *Network risk*

PwC's industry knowledge, supply chains expertise and our proprietary supply chain data and advanced analytical expertise, combine to provide a revolutionary solution to supply chain risk and resilience management

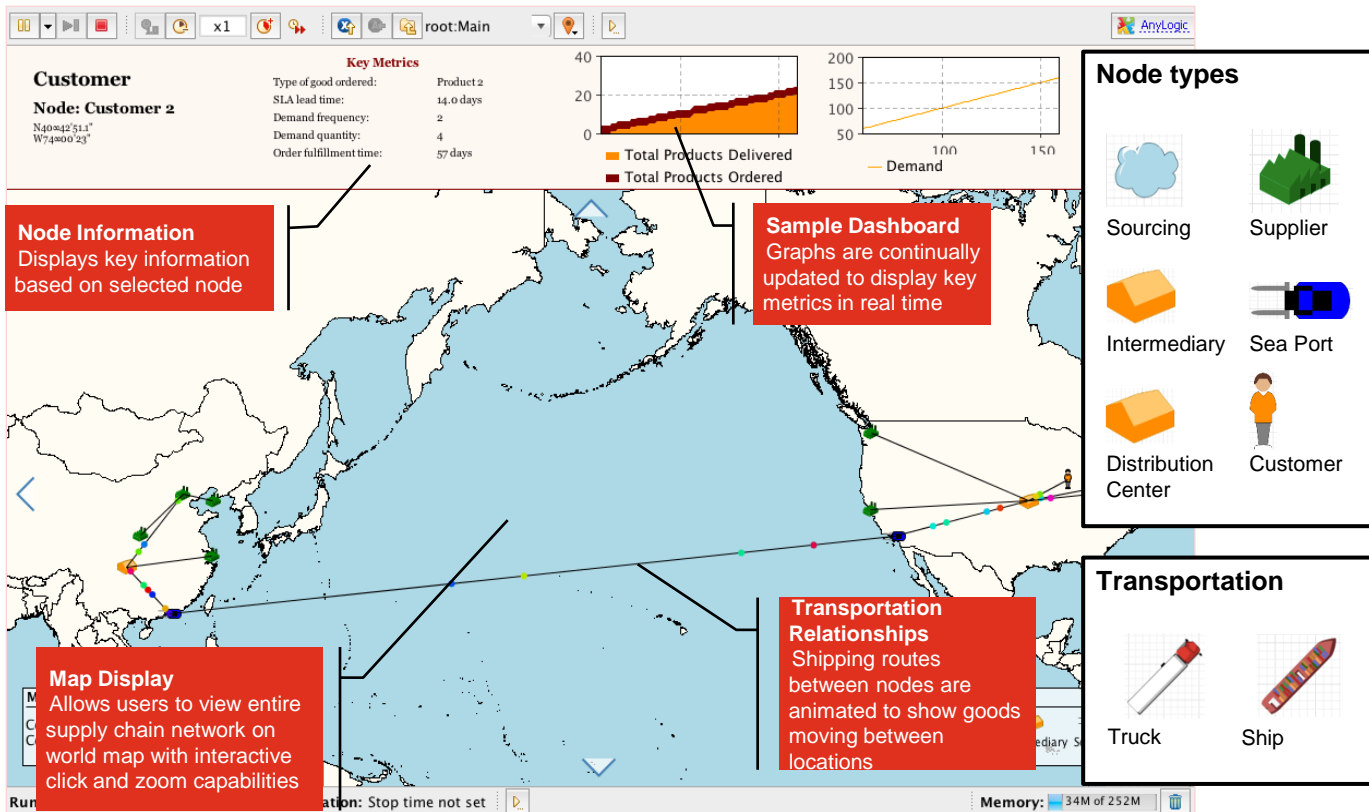
- **PwC's Supply Chain Risk Network Model** can be used to inform firms' supply chain risk management strategizing including:
  - Exposure information that insurance brokers can use in the marketing of supply chain risk transfer, and that insurance companies can use to price that risk (and to manage their supply chain risk accumulation, e.g., reinsurance)



Combining proprietary supply chain data, supply chain, risk and insurance experience, and expertise in advanced analytics, our integrated, practical Supply Chain Risk Model informs supply chain-related decisions

# Analytics bridge the information gap associate with supply chain risk management

Visualization of supply chain components and real-time outputs of key metrics allow for easy access to information

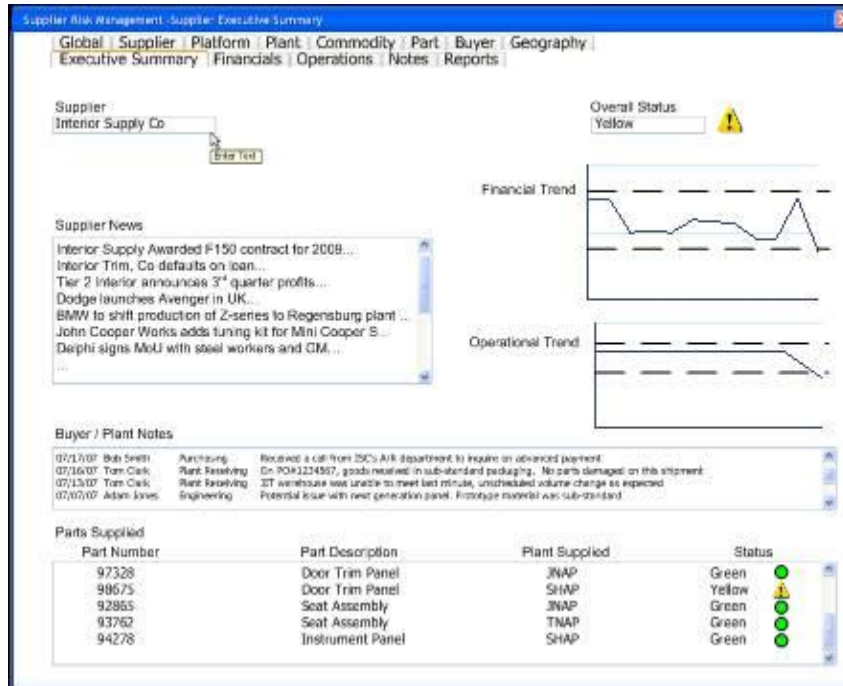


# Supply chain risk dashboards drive visibility and corrective action by illuminating and monitoring potential risks

## Sample inputs

- Region specific intelligence and risks
- Supplier diligence, periodic supplier reviews/QBRs
- Third-party financial information (D&B, S&P)
- Supplier self reporting
- Internal qualitative intelligence from employees
- Information and data from client's systems (e.g., delivery performance)

## Illustrative Dashboard



## Illustrative Drilldown

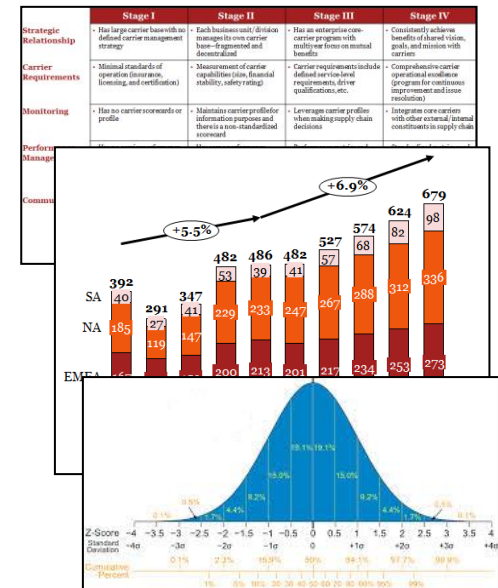


- Consolidated risk data
- Global view of risks
- Data analytics (e.g., sorts by geography, brand, product, part)
- Risk levels v. tolerances
- Risk response and compliance monitoring
- Early warning of changes in risk patterns and profile
- Multi-level Reporting

# The enhanced supply chain risk management solution delivers insight beyond traditional methods

This integrated approach provides:

- **Greater understanding of the supply chain:** The approach provides analysis of the supply chain with greater breadth and depth, creating a more transparent view of the end to end (E2E) supply chain and a greater understanding of a company's supply chain integrity
- **Ability to prioritize risk:** An E2E understanding of the supply chain provides the ability to quantify the potential upstream or downstream impacts of man-made or natural risks. This breadth of understanding facilitates prioritization of risks
- **Areas of focus:** Beyond risk prioritization, this approach can be used to identify weak areas of a supply chain, test diversifying or mitigation strategies, and explore new supply chain configurations
- **Informed decision making:** Interactive data visualization helps executives explore diversification, mitigation, or insurance strategies on the fly to understand trade-offs
- **Access to the most robust analytics:** Use of advanced simulation and network analytics provides insight into many supply chain challenges where the outcome are not fully understood due to complex interdependencies or nonlinearities between the actors



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***The Contingent Business Interruption (CBI) extension to the typical All Risks policy provides coverage:***

- When there is physical damage to customers' or suppliers' property.
- That prevents the customer receiving or the supplier rendering the Insured's products or services.
- Damage must be caused by an insured peril.
- Usually there must be damage to the type of property insured by the policy.

**In our experience clients are usually surprised by the limited extent of first party coverage for supply chain disruptions.**

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## ***Stress Testing CBI Cover***

- What tier of supplier or customer is covered?
- What territory is covered?
- Do I understand how percentage deductibles will operate for CBI?
- What happens if a covered cause results in the insolvency of a key supplier or customer?
- How does the coverage operate in the event of damage to infrastructure, but not to my suppliers' or customers' property?

**These are questions that nearly always arise immediately after a catastrophe affecting suppliers or customers. Working through these questions beforehand with your broker/insurer teams will help manage expectations and improve contract certainty.**

## ***Revenue Loss Considerations***

- US (gross earnings) form covers the *Period of Restoration* plus the *Extended Period of Indemnity*
- European (gross profit) form covers a specific period - the *Indemnity Period* – often limited to 12 or 24 months
- Each has advantages and disadvantages – your policy may allow you to choose between the two forms
- If revenue loss is delayed beyond the covered period recovery may be difficult
- If revenue loss is in the form of fines or contract penalties recovery may be difficult

**It is important to understand how revenue losses will relate to the period of coverage. Make sure that your broker and insurer partners understand how delays and disruptions may affect your customer contracts, and discuss how the coverage will respond.**

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## ***Do stakeholders understand the limitations of the All Risks policy?***

- Board / Audit Committee
- Management
- Operations
- Lenders
- Legal

...all will become involved in a major loss

**The purchase of supply chain insurance may become more attractive once the limitations of traditional business interruption insurance are understood by all stakeholders.**