



Building Supply Chain Resilience

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Resilience



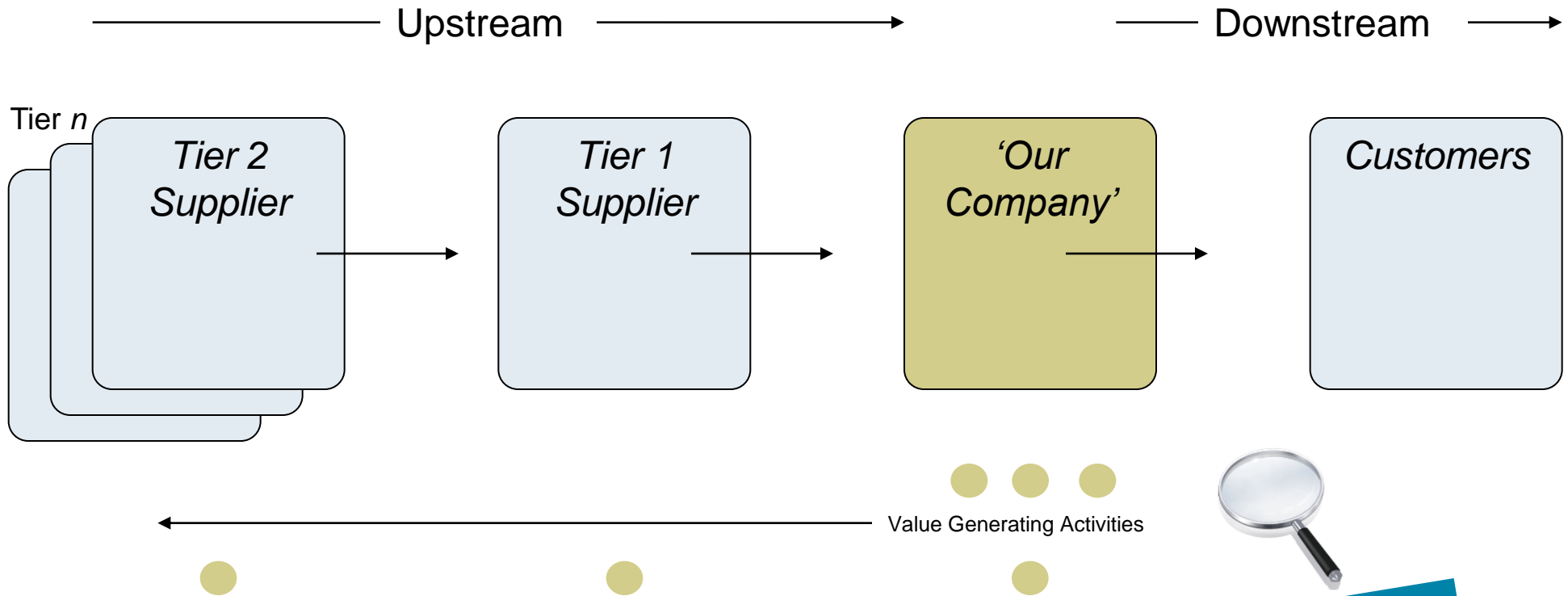
Define: *Resilience*:

The physical property of a material that can return to its original shape or position after deformation that does not exceed its elastic limit

BCI Supply Chain Report 2011. What are the Headline Issues?

- 85% of survey respondents experienced at least one disruption.
- 40% of analysed disruptions originated below the immediate tier one supplier.
- Adverse weather was the main cause of disruption at 51%, with unplanned IT and telecommunication outages in second place at 41%.
- Cyber attack rose to become a top three source of disruption in the Financial Services sector.
- Supply chain incidents led to a loss of productivity for almost half of businesses along with increased cost of working (38%) and loss of revenue (32%).
- The longer term consequences of disruption in the supply chain included shareholder concern (19%), damage to reputation (17%), and expected increases in regulatory scrutiny (11%).
- The earthquakes and tsunami experienced in Japan and New Zealand this year, affected 20% of responding organizations, headquartered in 18 different countries and across 12 different industry sectors.
- For 17% of respondents the financial costs of the largest single incident totalled a million or more Euros. For those with weaker supply chains, the number experiencing higher financial costs almost doubled to 32%.
- Only 8% of respondents could confirm that all of their key suppliers had Business Continuity (BCM) programmes in place to deal with disruption.
- Less than half of businesses check that BCM programmes are likely to be effective in practice.
- The ability to demonstrate resilience is starting to become a factor in purchasing decisions with 28% of respondents stating that they always or often have to provide assurance to prospective clients.

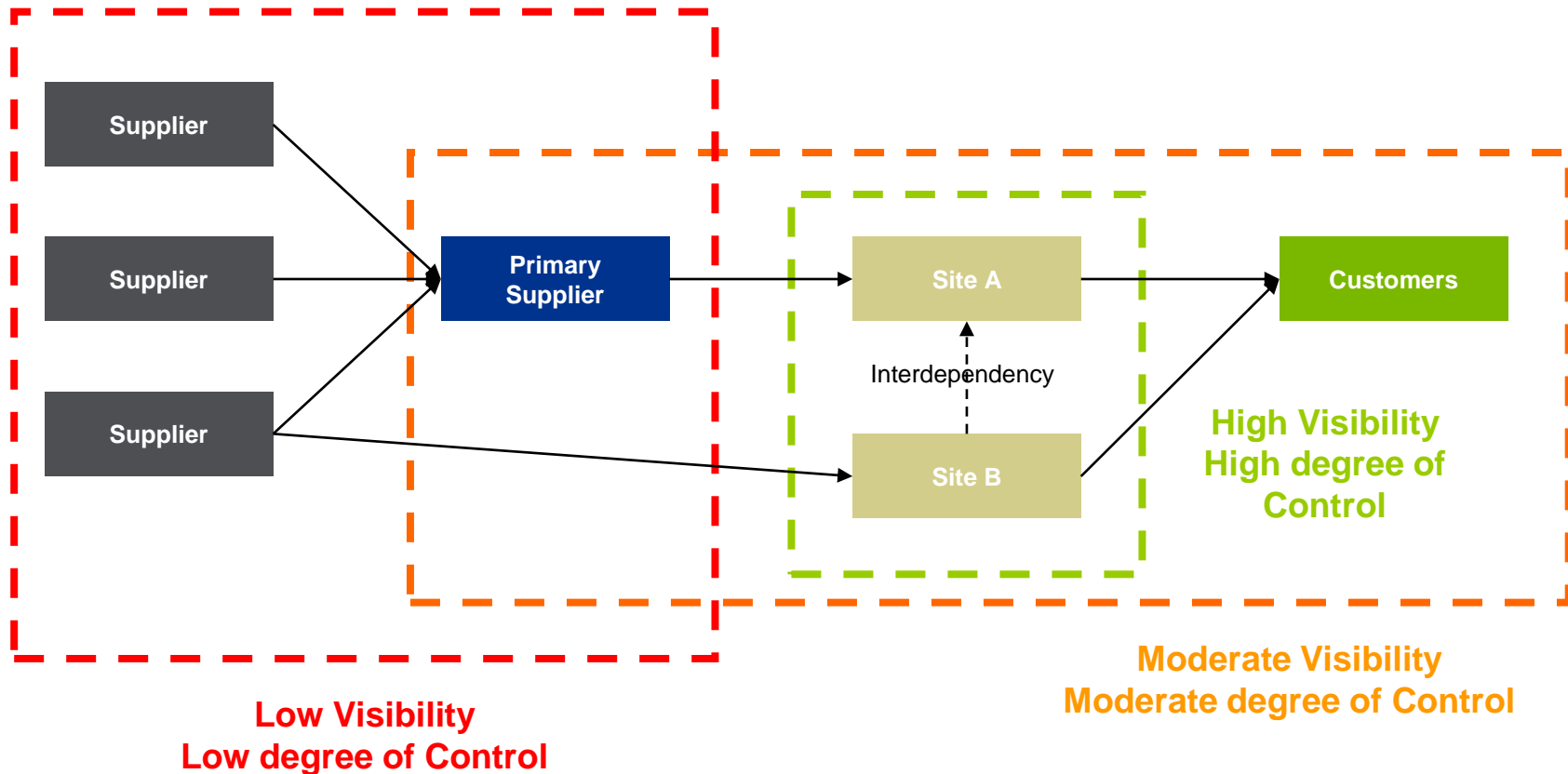
Supply Chain Basics



Level of control decreases with each tier of supply
And is harder to assure and insure

Supplier Identification

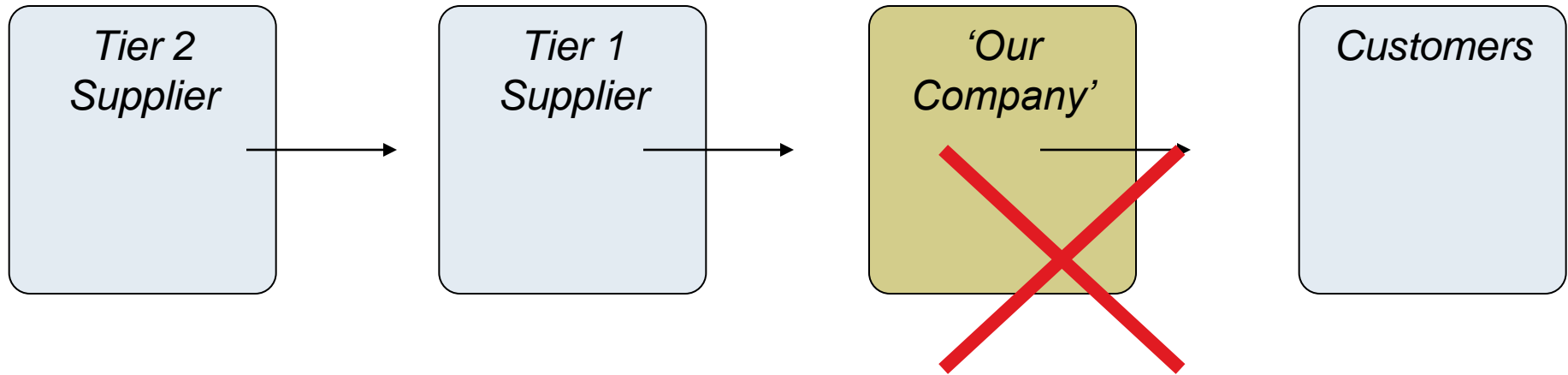
Mapping shows supplier interaction, visibility & control



Case Study #1 – ‘We Messed Up’

Change Management

Pharmaceutical Company



Background

A drug manufacturing facility was taken in house due to regulatory issues

Supply chain in place with a ‘make it & take it’ agreement with supplier

What Happened?

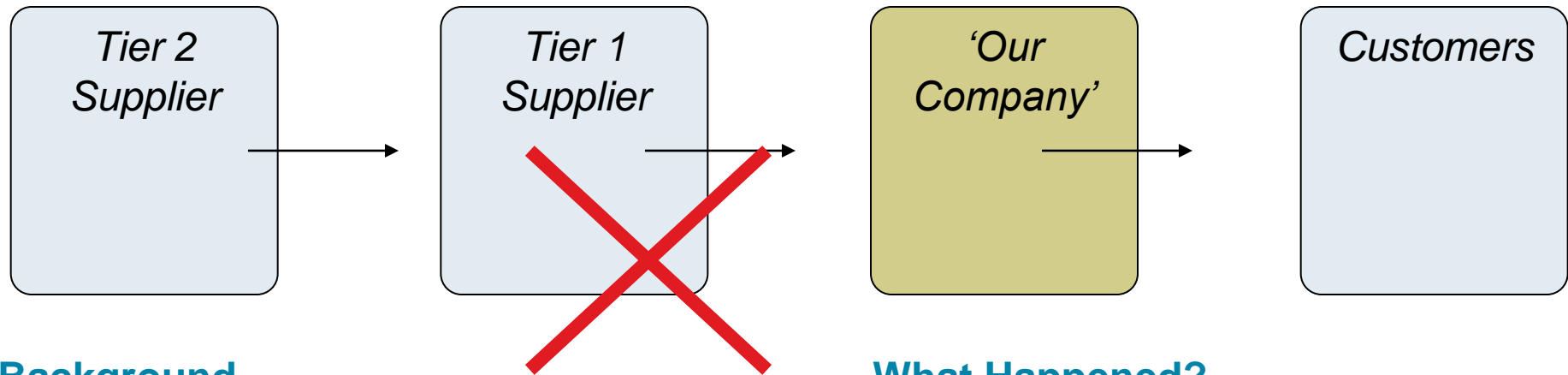
Serious fire at the facility

Supply Chain Interruption

Forced to take the stock from the supplier, and then dispose of it as it had a limited shelf life

Case Study #2 – ‘Face the music’

Entertainment UK (Woolworths)



Background

EUK was the most profitable arm of Woolworths Group

Major supplier of CDs and DVDs to UK market

Winner of several awards for supply chain management

What Happened?

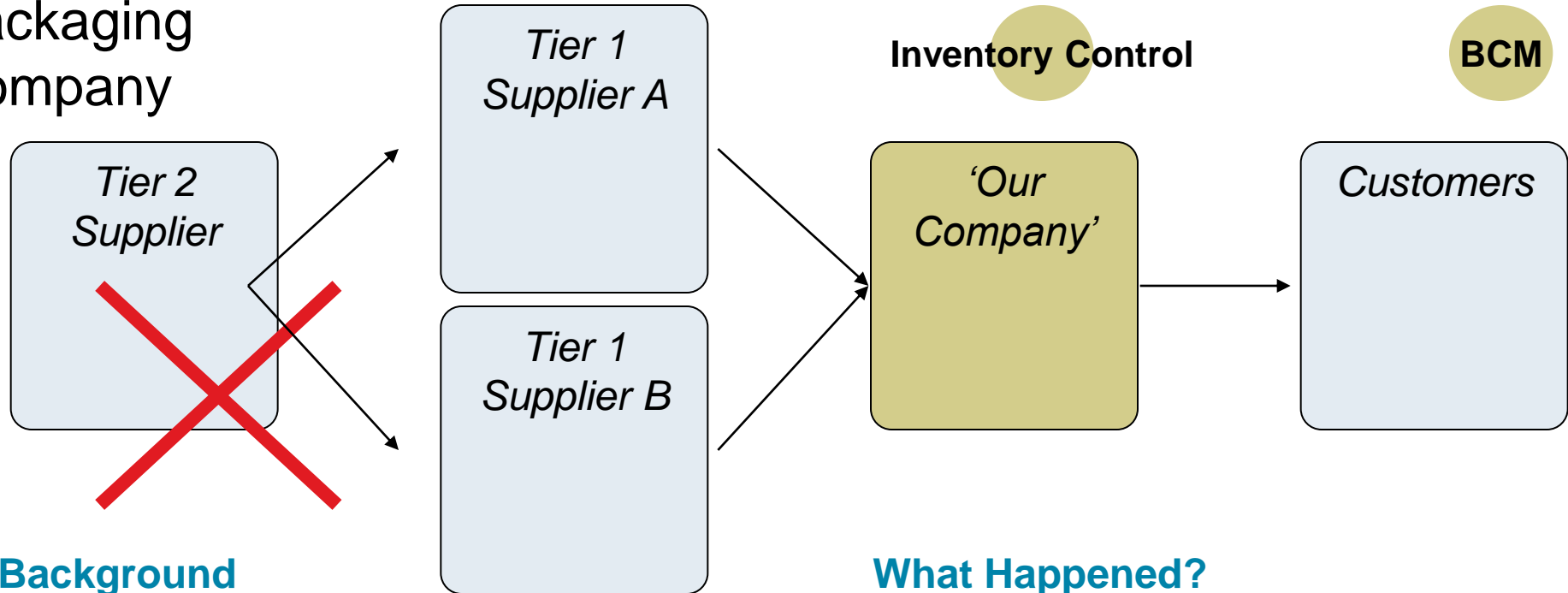
Woolworths Group and hence EUK put into administration in 2008

Zavvi (Virgin Megastores) had an exclusive supply deal.

Unable to get favourable terms from other suppliers Zavvi also forced into administration

Case Study #3 – ‘Two becomes one’

Packaging Company



Background

Manufacturer of rubber stoppers for phials

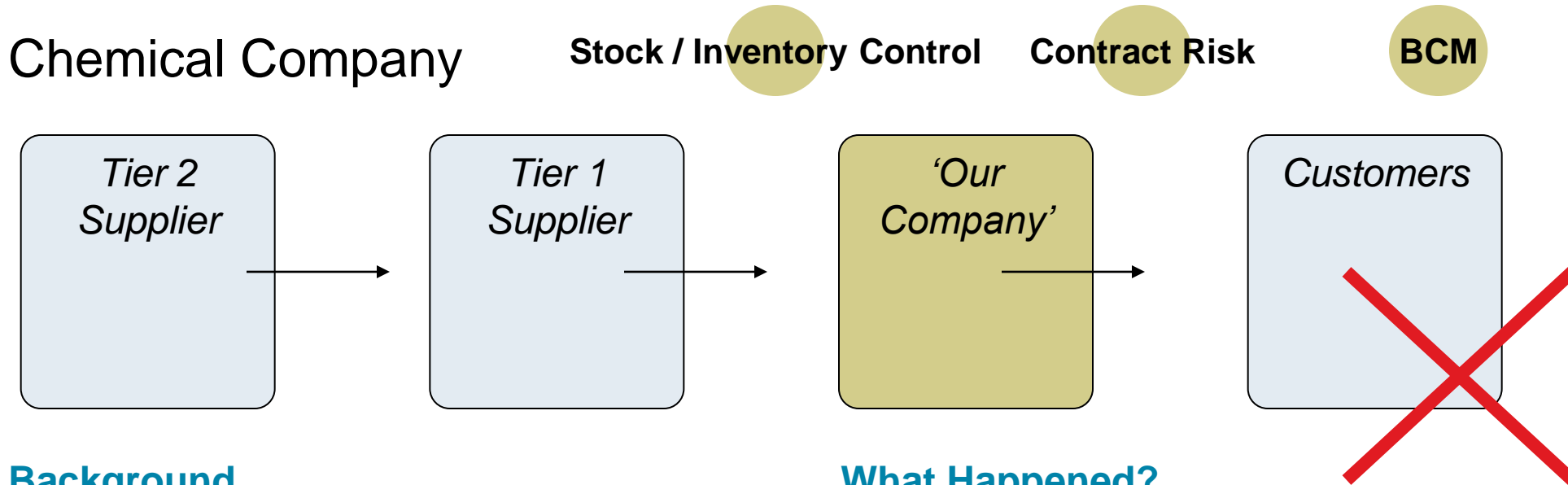
Rubber sourced from a Tier 1 supplier

What Happened?

Tier 2 supplier had a fire

Alternative Tier 1 suppliers were in place. Unfortunately they both sourced rubber from the same Tier 2 supplier.

Case Study #4 – Downstream Problem



Background

Large scale industrial chemical company

'Fixed supply chain' in that customers take output directly from a shared pipeline

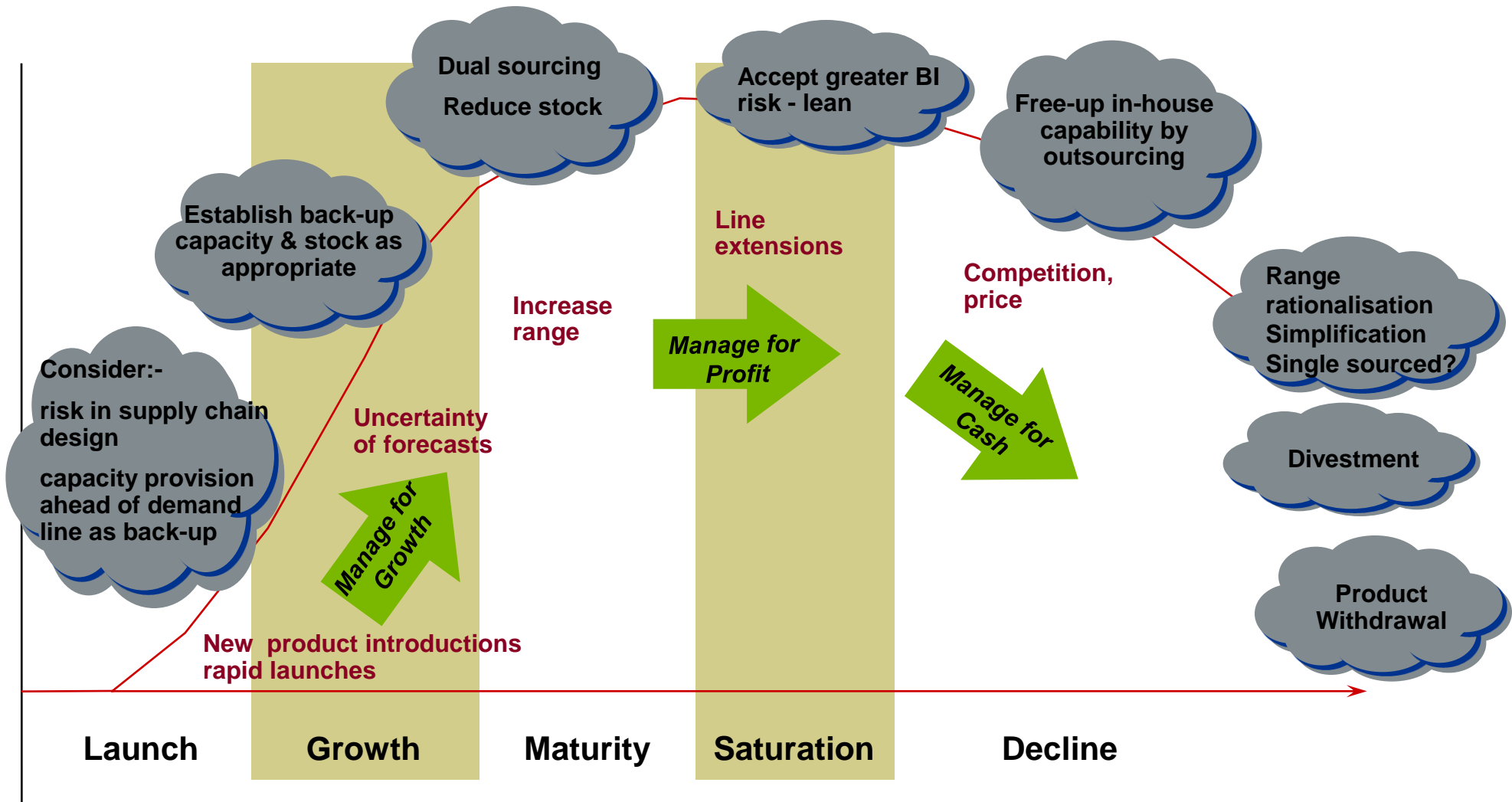
What Happened?

Unplanned shutdown of customer site

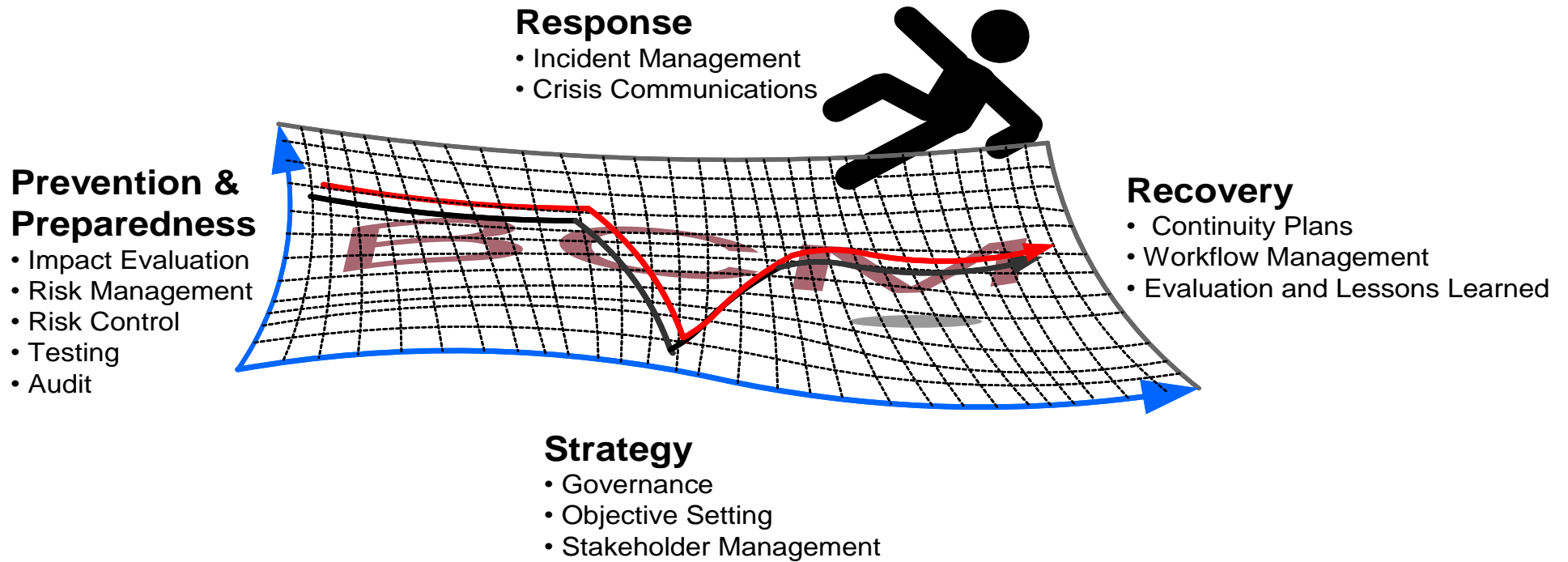
Sufficient output storage available (Site production policy was to run with minimum storage)

Arrangements in place with other customers to receive extra output in short term

Supply Chain risk profile across lifecycle

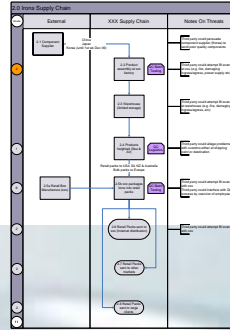


How to improve resilience



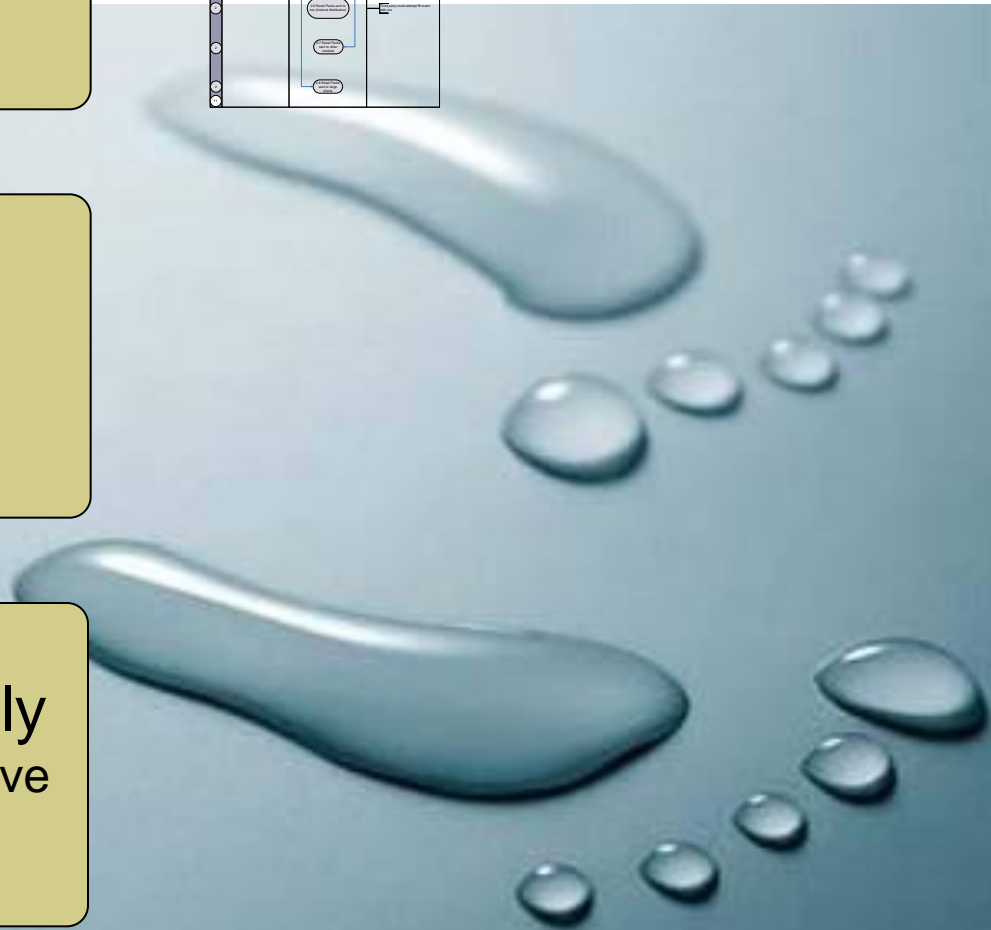
Three Steps To Improving Supply Chain Resilience

1. Create a model
(Know when the elastic band will break)

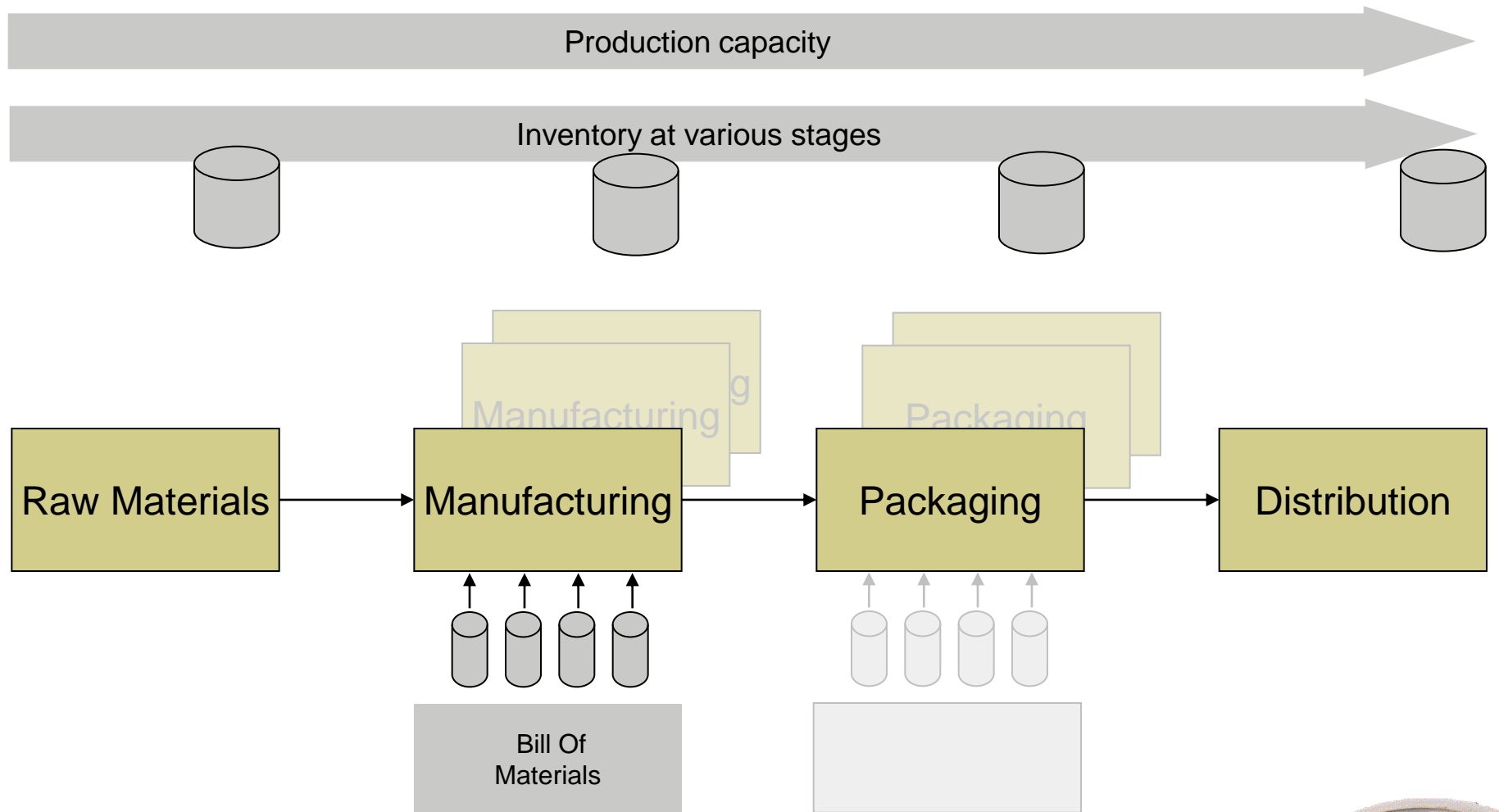


2. Quantify 'What Ifs'

3. Respond Appropriately
(Stop the band breaking – or have something else in place)



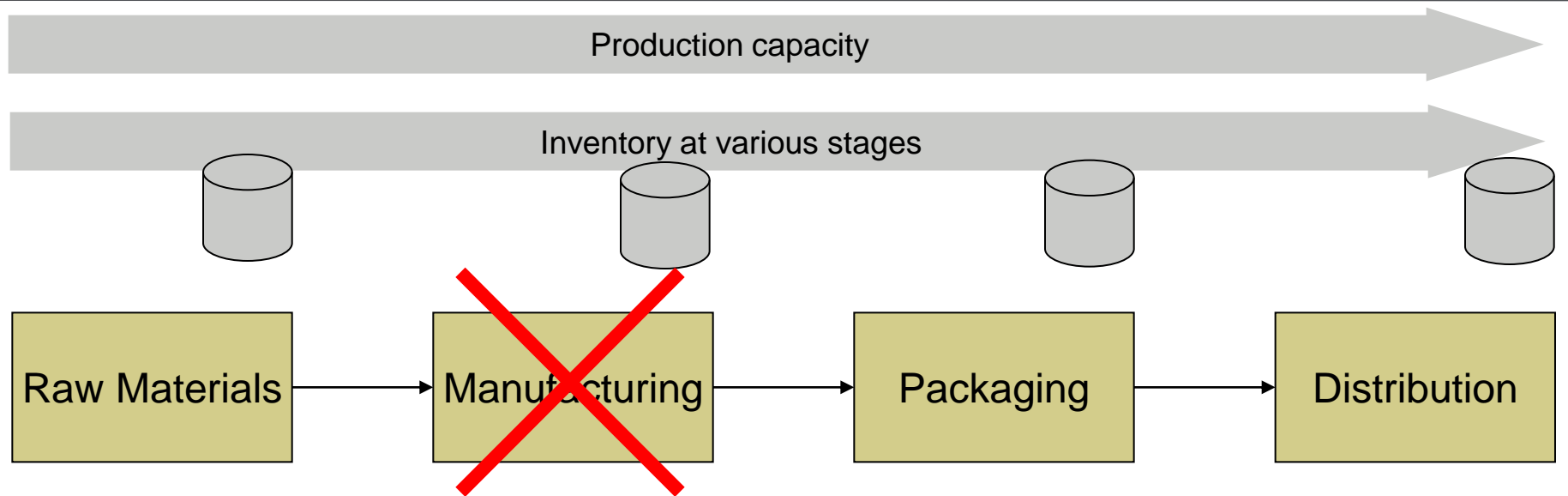
What is in the model?



This all relates (eventually) to time



So what do we calculate?

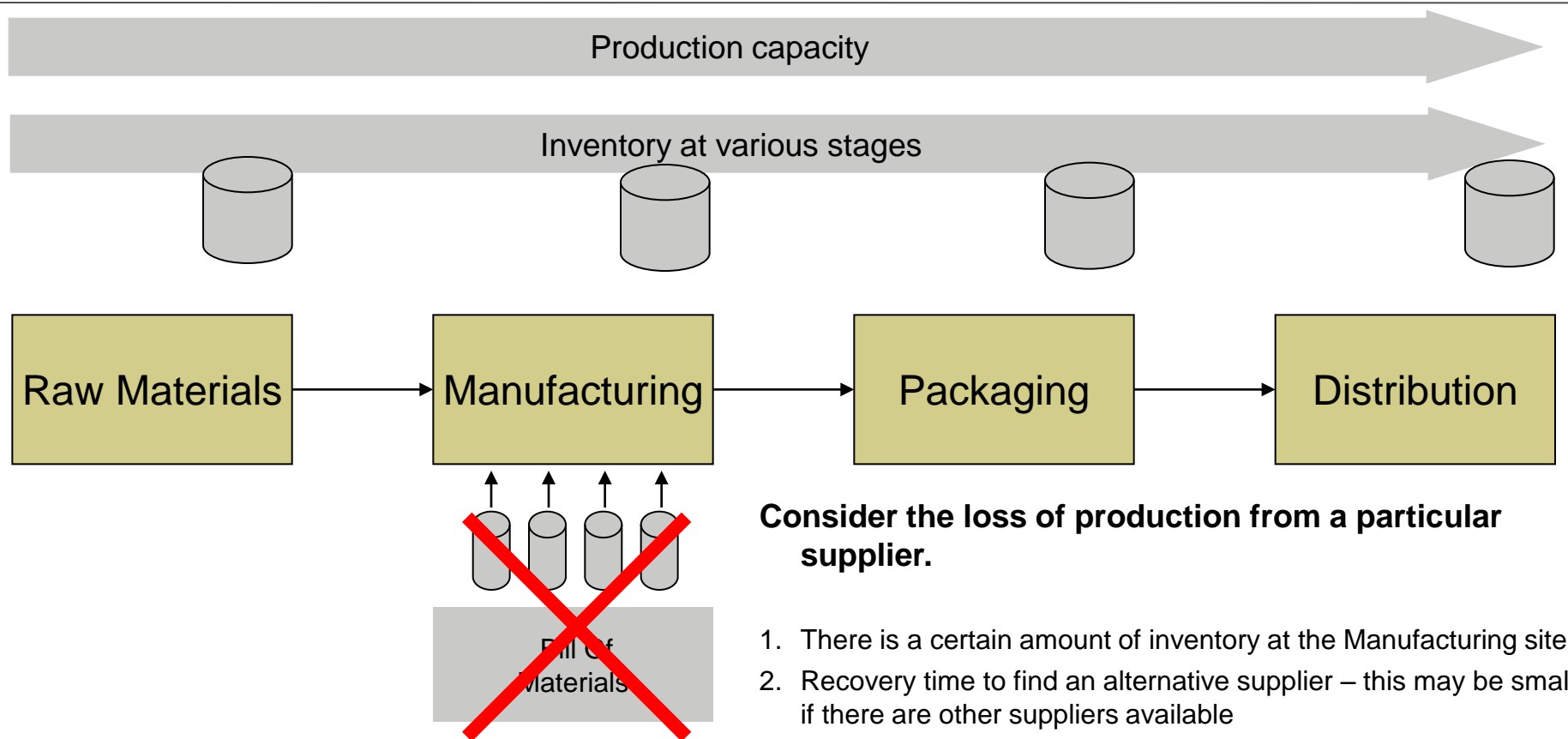


Consider the loss of production from a particular Manufacturing site.

Several types of risk event may lead to this outcome. Some insurable (e.g. fire, flood etc) some non insurable (Strike, Government restrictions etc).

1. Reduction of production capacity (e.g. if it is the only site -> 0%, if there are multiple sites we assume the others can go to maximum capacity which may make up some of the capacity shortfall)
2. Recovery time for the site
3. The supply chain can still operate for a certain length of time depending on the inventory in the downstream chain
4. The following components give us a **critical buffer time** (i.e. how long we can keep going before BI really starts): the stock buffer time (from 3), the production achieved in this buffer time (from 1)
5. Business Interruption occurs if recovery time (from 2) is larger than the Critical Outage Time (from 4)

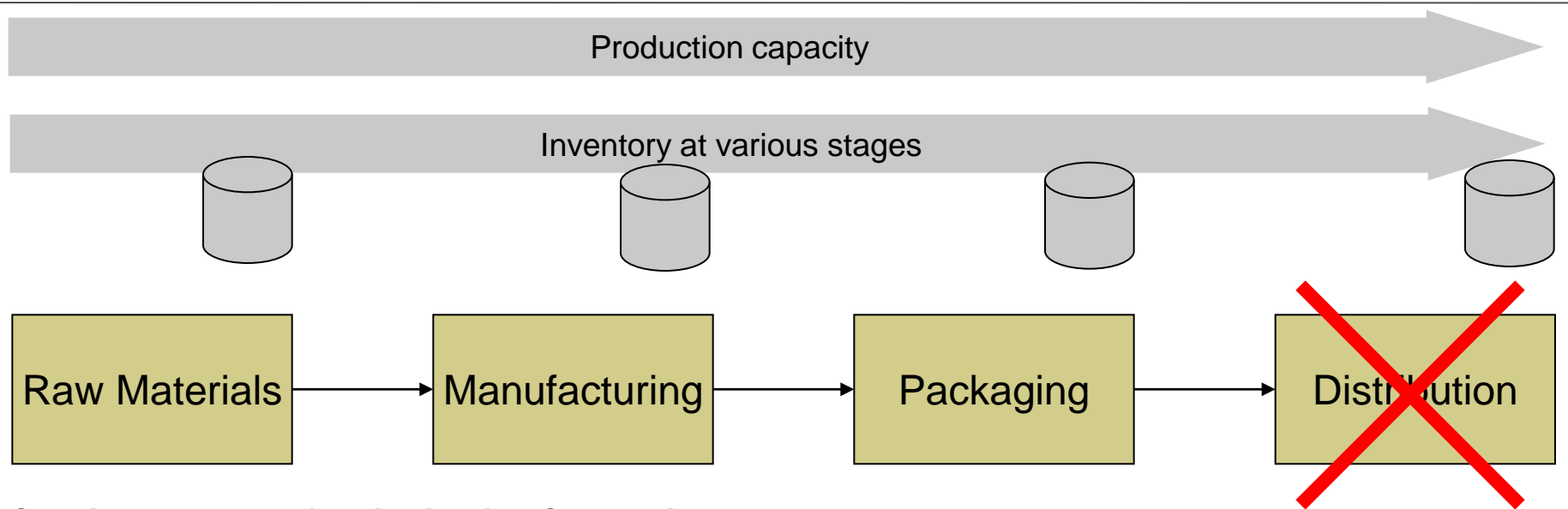
So what do we calculate?



Consider the loss of production from a particular supplier.

1. There is a certain amount of inventory at the Manufacturing site
2. Recovery time to find an alternative supplier – this may be small if there are other suppliers available
3. The supply chain can still operate for a certain length of time depending on the inventory in the downstream chain
4. The following components give us a **possible outage time** is : the inventory buffer time (from 1), the recovery time (from 2)
5. Business Interruption occurs if possible outage time (from 4) exceeds the **critical buffer time** for the Manufacturing site

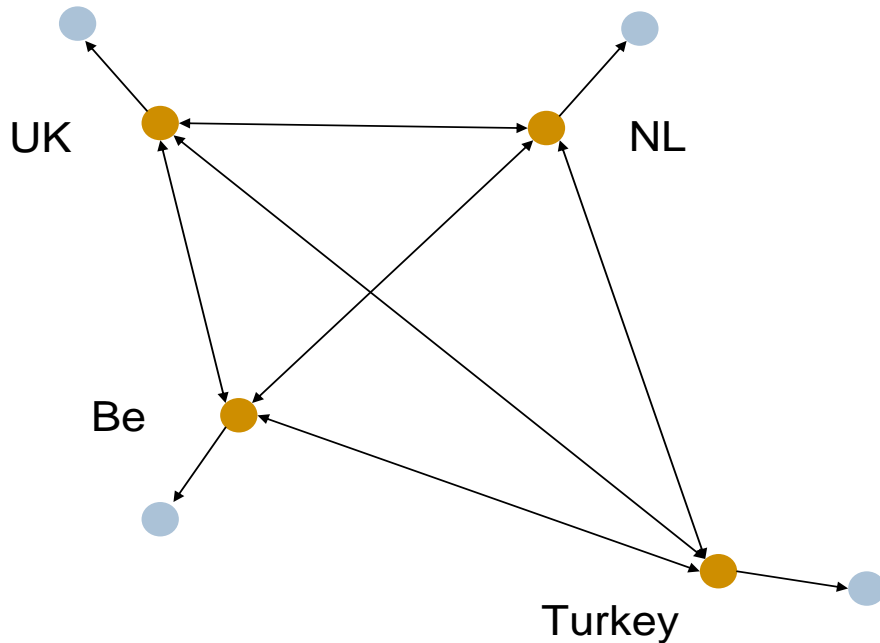
So what do we calculate?



Consider the loss of a Distribution Centre site.

1. Reduction of production capacity – may be zero if at the end of the chain and **if we can meet demand by directly shipping from production**
2. Recovery time for the site
3. The supply chain can still operate at full production capacity
4. The following components give us a **critical buffer time** (i.e. how long we can keep going before BI really starts): the time to put in place alternative logistics arrangements
5. Business Interruption occurs if recovery time (from 2) is larger than the Critical Outage Time (from 4)

Production Optimisation



A production model has been developed for white goods manufacture across the four European sites.

Notable features include:

- A production optimiser that gives the minimum cost production distribution based on manufacture and transportation costs
- Optimiser works between minimum and maximum levels of production at sites
- Variable costs due to increased shift work
- Business interruption exposures based upon a demand profile across a year
- Consideration of stock levels on actual BI numbers

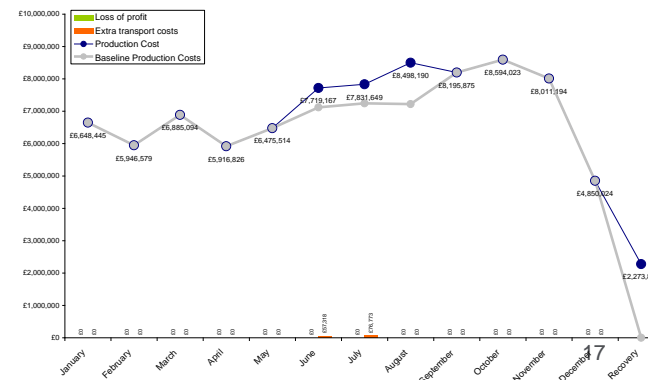
The Excel model estimates the following:

Production cost delta – i.e. difference in cost of production given a BI event

Additional transport costs – arising from supplying from stock

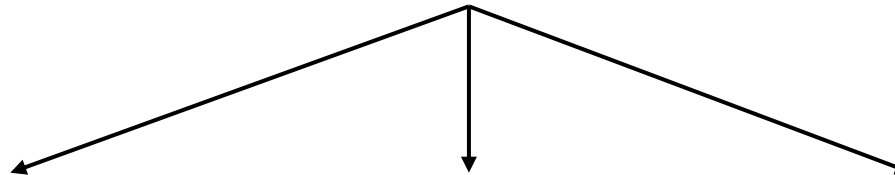
Shortfall production costs – production costs to bring stock up to pre BI event level

Loss profit costs – loss of profit when demand cannot be met



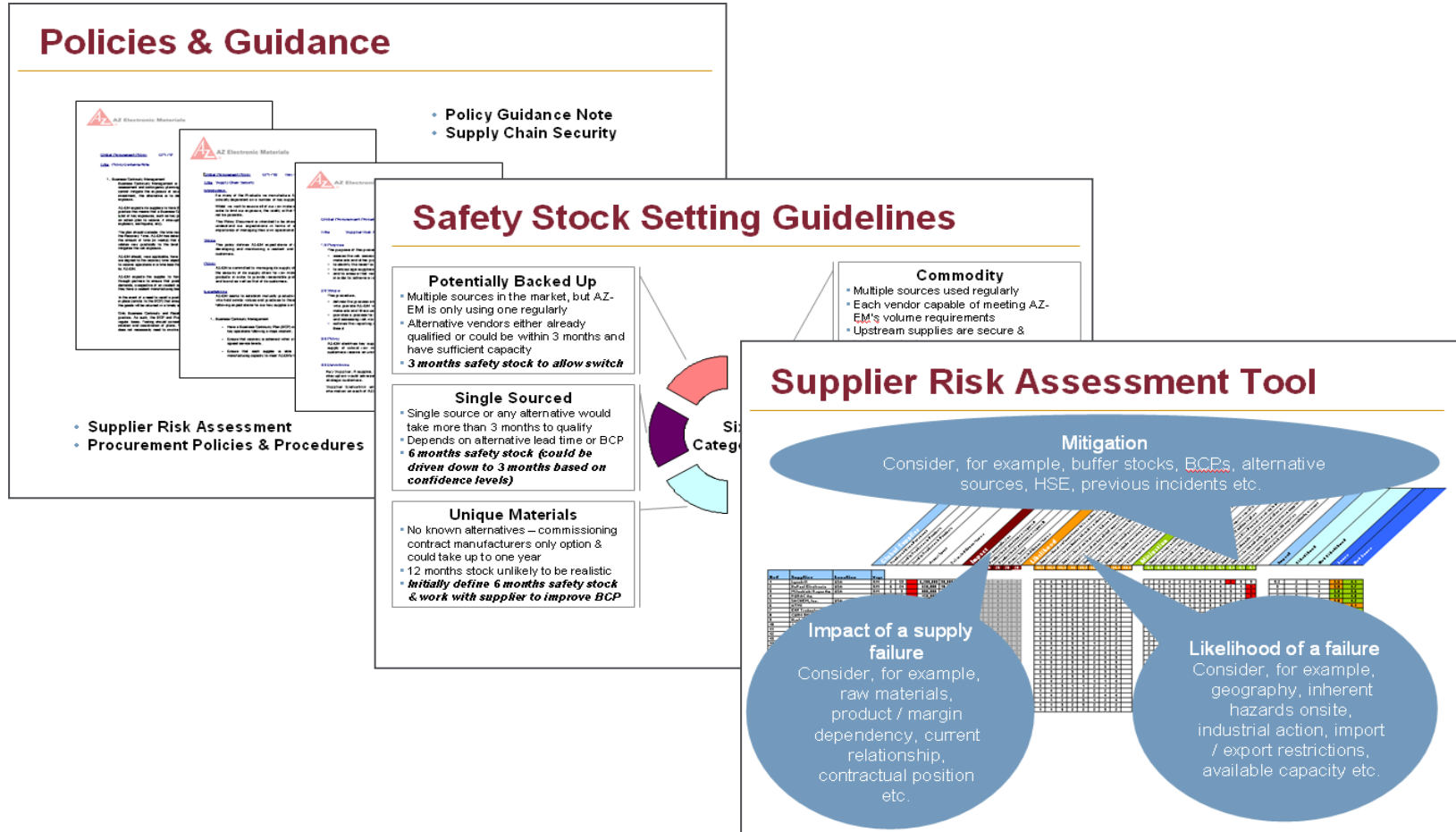
Developing Action Plans

Immediate Actions to be Taken



<h3>Mitigation</h3> <p>Prevent risk from occurring</p>	<h3>Contingency</h3> <p>Minimise loss after risk occurs</p>	<h3>Transfer</h3> <p>Absorb impact of residual exposure</p>
<p>Risks will be managed through risk management techniques and controls.</p>	<p>Risks will be analysed from a post-incident loss perspective and will have contingency plans built around them.</p>	<p>Risks will be covered by insurance or other risk transfer methods.</p>
<p>Some examples include,</p> <ul style="list-style-type: none"> Spare parts – hold critical spares Stock / Inventory – increase stock levels of key supplies / intermediates Contract management – change contract terms and conditions Supply chain audit – audit and vet suppliers 	<p>Some examples include,</p> <ul style="list-style-type: none"> Alternatives – identify alternate locations and suppliers Lead times – reduce lead times Redundancy – build internal and external redundancy Communication & Relationships – improve customer communication protocols and improve relationships 	<p>Some examples include,</p> <ul style="list-style-type: none"> Business Interruption – Insurance for loss following interruption Contract – Transfer of liability via contract to 3rd party Supply Chain Insurance – Non-Damage BI insurance cover for supply chain

Example Supplier Evaluation Process



Summary – Some ideas to increase Supply Chain Resilience

- Companies may accept different supply chain risks depending on the stage of the production lifecycle
- Supply Chain risks are closely related to business interruption and product recall risks.
- Resilience depends on having alternatives and creativity. Companies need to make time to nurture this.
- A multi discipline approach is required to address supply chain risk. including Procurement, Production, Logistics, Insurance, Loss Control, Legal, Finance, Planning etc.

- A simple approach for resilience is based upon the following:
 - Preparedness
 - Response
 - Recovery
 - Strategy

- Create a model to allow you to test scenarios

- Test your assumptions on the response to ‘what ifs’ particularly;
 - Contractual arrangements
 - Business Continuity Management
 - What is possible

- Know your inventory strategy
- Be clear on trends – when are they going to be reviewed?
- Know what your organisation is comfortable with



Contingent Business Interruption losses

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Principal – Claims Consulting and Risk Accounting

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Incidents triggering supply chain disruption

- Insured incident
- Unforeseen
- Complex
- Far reaching impact
- Extent of supply disruption
- Identification of critical supply
 - Geographically critical
 - Lack of alternative suppliers
 - Uniqueness of technology
 - Supplier level classification



Classification of suppliers

- Supply chains are often multi-tiered
- Different limits
 - 1st tier supplier
 - 2nd/3rd tier supplier
- Surveyed
- Specified / Named
- Identification of risk – Contingent BI
 - Availability of stock
 - Unique supply / available alternatives
 - Alternative suppliers not available
 - Components are unique
 - Mitigation / lead time
 - Remodelling of end-product
 - Other suppliers need testing / certification



Insured Damage

- An insured event may cause damage to one supplier
 - Fire
 - Explosion
 - Product recall

- An insured event may cause damage to more than one supplier
 - Earthquake
 - Flood
 - Tsunami

- Components may be used in a number of different products

- One product may be interrupted due to supply shortage from a number of components

- Loss of utilities

- Consider a number of natural disasters over the last year
 - Japanese earthquake and tsunami
 - Thailand floods

Japanese Earthquake and Tsunami

- Contingent Business Interruption cover – Multiple cause of loss
 - Earthquake damage and tsunami damage
 - Radioactive exclusion
 - Prevention of Access / General area damage
- All of the above may attract different sub-limits



- How were the suppliers affected?
- Actual interruption and loss mitigation
- All components are required for manufacture
- Is it possible to identify a critical component?
- Losses far exceed sub-limits
- Should losses be excluded above a relevant sub-limit?
- Can sub-limits be accumulated?

Japanese Earthquake and Tsunami

- Difficult to identify suppliers which are affected
 - Liaise with commodity buyer
 - How much was supply of each component affected?
- How have the suppliers been affected?
- What is the expected production outage of the supplier?
- Increased costs to mitigate outage
- Loss calculation? Production v Sales

Policy wording

- Policy limitations and exclusions can impact a potential recovery
- The following coverage is available:
 - At insured locations
 - To property of the type insured
 - Within the coverage territory
 - From an insured peril
 - Where no exclusion or restriction applies
 - Which results in an interruption of operations



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