

ECASY



# SUPPLY CHAIN RIPPLE EFFECTS – BECAUSE THEY MATTER

## Part 1

A CLEARPRISM WHITE PAPER

**CLEARPRISM**

Powered by: **CapImpact**

Focused on execution,  
powered by analytics.

Proven algorithmic methods, experience and  
tools that eliminate guesswork and risk.

877-717-7476 | [clearprism.com](http://clearprism.com)

## Why This Matters

Competitive environments are made up of a collection of industries that produce different types of goods and services. Each of these industries has corresponding supply chains that source inputs which are turned into outputs – and value – for that industry and its associated businesses. Supply chains differ by industry, of course. Manufacturing companies for example, are more dependent on refined raw materials than are financial services companies. Yet, manufacturing companies are also dependent on services (inputs) from, let's say banks. And correspondingly, banks depend on a certain amount of outputs from manufacturing companies to deliver its services. Such outputs from manufacturing companies are “inputs” into the work the banks do - in the form of computers or other electrical equipment. In this way, industries are linked through a set of input-output relationships.

## But why does this matter?

Because “events happen” – ranging from banal to disruptive, from a new marketing campaign to a trade dispute resulting in the introduction of a tariff which may lead to a counter-tariff or other regulatory change to more disruptive events. To take but one example, a particular tariff or regulatory change may not be targeted at your industry. However, it may be targeted at one of the industries that provides inputs to you, with potential ripple or cascading effects of changes in prices, delays in delivery or some more extreme impact.

Businesses are buffeted by millions of events that happen globally every day. Yet only a few of them matter. A key question becomes: how do you “amplify the faint signals” from the multitude of events that may impact you from every corner of the world? It's hard enough to monitor events that directly impact your industry or supply chain. What about those that impact your partners or supply chains that are either sources of inputs or customers of outputs from you? The network of input-output relationships in which you are embedded is complex and given that complexity, not always seen or understood, until it's too late not to.

So, here's the blunt reality. A tariff, a regulatory change, or any of a number of business-impacting events may not be targeted at your industry. However, it could still have a material impact on you. The question becomes: how do you figure out if, how and how much such ripple effects could impact you, your business, and your customers? And this is where insights into the degree to which different industries and their

corresponding supply chains are linked through input-output relationships becomes helpful. How? By building predictive “muscle” so that as different types of events occur, you can:

- a. Predict what the potential impact may be,
- b. Identify which specific inputs / outputs (we call them capabilities) and their corresponding KPIs (key performance indicators) are likely to be impacted
- c. Strengthen traceability between events through “cascade lanes” of potential impact across industries and capabilities and consequently,
- d. Mitigate specific risks from events **before** they happen.

## Two more points before we explore ripple effects across different supply chains.

**First** – on partner networks and how insight into them is aided by input-output insights.

Partner networks have a simple objective: to provide capabilities you need either because you don't have them, or you want to strengthen them. Many partners come from industries outside of your own. As is well known, insight into who your Tier 1 partner and what it is that they deliver to you is clear – and typically contractually aligned. However, insight into your Tier 2 and Tier 3 and so on seldom exists. Which is problematic since risk exposures on your expanded (Tier 2 and beyond) partner network can cascade to create both risk and financial exposures on you. Resilinc, a supply chain risk monitoring company, estimates that over 50% of most company's risk exposures come from their Tier 2 and other partners. The problem is: there is little way to identify such exposures until they happen; in short, until it's too late.

There are algorithmic methods predict and quantify the risk exposure of your expanded partner network – a topic for another post. Insights into supply chain dependencies across industries can help anticipate what types of ripple effects are likely to occur and thus what parts of your partner network to monitor.

**Second** – so what can we really do if a shock is outside of our control?

Having foresight and traceability - from different types of events or shocks across differing supply chains is clearly helpful to re-allocate resources to mitigate risk. But what else can be done, really?

After all, industries that receive shocks pass those shocks onto other industries that need their products as inputs into their supply chain. What can you do, for example, as an industrial manufacturing company if such shocks are part of an overall industrial shock in a different industry from yours – e.g., a steep tariff on rare minerals that impacts the price of electronic componentry? The answer is, it depends. On a) the expected duration of the shock, b) extent of the price shock and whether or not it could easily be passed on to your customers and critically, c) the ease / cost of substitution of the particular inputs impacted. Industry shocks may be more important due to the inability to easily substitute across inputs. Perhaps. But, here's our point. This is *\*precisely\** the topic executives should be focusing on: re-assessing the strategic implications of their sourcing strategies, the design of their partner networks, and the degree to which they can shift sourcing in support of specific / granular capabilities under different conditions. Of course, having and executing on tactical plans to respond quickly to supply shocks are important. But, predictive insights in support of such strategic considerations will strengthen tactical plans and make them more effective and arguably, less costly.

## Supply Chain Ripple Effects

Supply chain dependencies can be assessed, and visualized, through input-output linkages. Such linkages vary across time given changes in products, technologies and what is needed *\*as\** inputs. Pragmatically, this means that insight into what makes up these changes provides foresight into how ripple effects will occur within your business and the specific capabilities and KPIs likely impacted as a result. We'll cover how to derive such foresight algorithmically in another post. For now, the point is simple: supply chain dependencies highlight potential ripple effects and consequently potential risk exposures to different types of events, or shocks. The extent of these dependencies change over time. Such changes can be monitored to predict the changing competitive structure of your particular industry through amplifying the faint signals of change in those of your partners from other industries. But first things first.

The table below depicts dependencies across 16 different industry supply chains. The table depicts the degree to which the output of any particular industry (the rows) is consumed by other industries (the columns).

Industries	Petroleum products.	Pharmaceutical products	Metals	Electronics	Electrical	Air Transportation	Telecommunications	Financial Services, excluding insurance	Insurance	Food and Agriculture	Chemicals	Metals Processing	Industrial Manufacturing	Warehousing	Other
Food and Agriculture	0%	1%	0%	0%	0%	0%	0%	0%	0%	63%	2%	2%	0%	0%	30%
Metals	7%	0%	2%	0%	1%	0%	0%	0%	0%	31%	1%	17%	1%	0%	36%
Petroleum Products	4%	0%	0%	0%	0%	2%	0%	0%	0%	42%	6%	10%	0%	6%	25%
Chemicals	1%	1%	1%	1%	1%	0%	0%	0%	0%	40%	16%	5%	1%	1%	29%
Pharmaceutical Products	0%	7%	0%	0%	0%	0%	0%	0%	0%	54%	3%	2%	0%	0%	32%
Metals	0%	0%	5%	1%	2%	0%	0%	0%	0%	24%	1%	6%	4%	0%	52%
Electronics	0%	0%	0%	19%	2%	0%	1%	0%	0%	31%	0%	4%	2%	0%	38%
Electrical	0%	0%	0%	4%	7%	0%	1%	0%	0%	23%	0%	6%	3%	0%	52%
Manufacturing of machinery	0%	0%	1%	1%	2%	0%	0%	0%	0%	29%	1%	9%	11%	1%	39%
Warehousing	1%	0%	1%	0%	1%	1%	0%	0%	0%	34%	2%	10%	1%	7%	40%
Air Transportation	0%	0%	0%	1%	0%	3%	0%	1%	0%	35%	1%	11%	1%	2%	38%
Telecommunications	0%	0%	0%	0%	0%	0%	8%	2%	1%	31%	0%	9%	0%	1%	44%
Financial Services, excluding insurance	0%	0%	0%	1%	0%	0%	0%	4%	1%	27%	1%	19%	1%	2%	40%
Insurance	0%	0%	0%	0%	0%	0%	0%	1%	15%	20%	0%	22%	0%	2%	38%
Other	0%	0%	0%	1%	0%	0%	1%	1%	1%	28%	1%	13%	1%	1%	48%

For example, 7% of the metals industry is purchased / consumed by the Petroleum Industry, and 31% by Food and Agriculture industry. Implication? Shocks on the metals industry would primarily impact the Food & Agriculture sector, followed by Petroleum.

The input-output relationships can be visualized differently to highlight what is known as the “centrality” of individual industries. Centrality highlights the extent to which a particular industry is connected to others – e.g., how “central” it is. Measuring network density can shed light on the extent to which shocks are likely to propagate throughout the economy through input-output linkages. The same technique is used to identify and consequently predict the ripple effect of different types of risk exposures on one’s partner network.

## So what and why does this matter?

Shocks happen. They have ripple or cascade effects across capabilities that make up a supply chain as well as differing supply chains and partner networks. Ripple effects consequently create exposures with potential implications on both financial and operational metrics. Surprises in supply chains are never a good thing. Any insight to lower the likelihood of surprises can save time, costs and revenue. Being able to respond quickly to events once they happen is a necessary “organizational muscle” to have. Being able to predict what is likely to occur and consequently adjusting appropriately is a differentiating muscle to build. Amplifying the faint signals of shocks and predicting their specific pathways of potential impacts – on capabilities, through partner networks, through supply chains, and onto specific KPIs – is one way to begin strengthening this muscle.

### About the Author:

Ralph Welborn, Ph.D. Managing Partner and Co-Founder, ClearPrism

Previous roles included Head of Strategy & Transformation (IBM – Middle East / Africa), Senior Vice President Global Strategy, KPMG Consulting, CEO of Advanced Analytics Company. Author of three books on Business & Technology Transformation.

Ralph can be reached at [ralph.welborn@clearprism.com](mailto:ralph.welborn@clearprism.com)



Boston, Chicago, Dallas, Kansas City, New York, San Francisco

+1 877 717 7476 | [info@clearprism.com](mailto:info@clearprism.com) | [clearprism.com](http://clearprism.com)

©2017-2020, CLEARPRISM, LLC. All rights reserved.